Final

Five-Year Review Report

IR Site 1: Old Base Landfill
IR Site 2: Fire Training Area

Former Naval Training Center – Bainbridge
Port Deposit, Maryland

Contract N40080-12-D-0451
Task Order 0007

Prepared for:

Naval Facilities Engineering Command
Washington
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Executive Summary

Naval Facilities Engineering Command (NAVFAC) Washington (Navy) conducted this Five-Year Review for the former Naval Training Center – Bainbridge (NTCB) in Port Deposit, Maryland, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with the U.S. Environmental Protection Agency (USEPA) guidance titled *Comprehensive Five-Year Review Guidance,* dated June 2001 and the USEPA Memorandum *Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews* dated September 2012. This Five-Year Review document for the former NTCB addresses remedies and remedial actions (RAs) that have been implemented at two sites for which there is a Record of Decision (ROD) in place for constituents remaining at concentrations that do not allow for unrestricted use and unlimited exposure. The ROD for NTCB addresses Site 1 - Old Base Landfill (OBL) and Site 2 - Fire Training Area (FTA).

The objective of this Five-Year Review is to evaluate current remedies at the OBL and FTA to determine whether the remedies remain protective of human health and the environment in accordance with the requirements set forth in the ROD and subsequent Explanation of Significant Differences (ESD). The evaluation of the protectiveness of the remedies consisted of a thorough review of various reports and documents pertaining to site activities and findings, site inspections, and interviews with appropriate regulatory, Navy, and Bainbridge Development Corporation (BDC) personnel. The methods, findings, and conclusions presented in this Five-Year Review report are intended to identify any issues that may prevent a particular remedy from functioning as designed or as appropriate to protect human health and the environment.

In general, the remedies are functioning as designed. The remedy has been determined to be protective of human health and the environment based on preventing groundwater use and offsite migration of contaminants, and determined to offer short-term protectiveness based on preventing disturbance of the landfill cap to ensure that no excavation takes place over this footprint. Groundwater exposure pathways that could result in unacceptable risks are being controlled and institutional controls (ICs) are preventing exposure to, or the ingestion of, contaminated groundwater.

Recommendations of this Five-Year Review are that groundwater monitoring and enforcement of ICs should continue to be implemented as specified in the ROD and the 2009 ESD until performance standards are met.

Site 1 - Old Base Landfill

The Remedial Action Objectives (RAOs) presented in the ROD are being achieved through the implementation of both institutional and engineering controls. Performance Standards, set forth by the ROD (ROD Performance Standards), for acceptable concentrations of chlorobenzene, iron, and manganese in groundwater were established as a protective measure and were to be achieved within the first five years following finalization of the ROD. The performance standards were established based on human health risk and are considered site specific Applicable or Relevant and Appropriate Requirements (ARARs.) Chlorobenzene has been removed from the long-term monitoring program by the Navy, with concurrence from USEPA, based on the results of multiple rounds of data which demonstrated that all concentrations were below the ROD Performance Standard.

Concentrations of dissolved iron and dissolved manganese have generally decreased since monitoring began in 1991. Over the past five years, only iron and manganese have been

consistently detected in wells 1-GW-3 and 1-GW-8, respectively, above the ROD Performance Standards.

The ROD Performance Standards in part states: *"If any COC (constituent of concern) concentration in the areas impacted by the OBL and FTA sites and defined in the transfer deed is greater than the concentrations shown in the ROD Performance Standards Table within five years of the execution of the ROD, then the Navy shall implement a remediation plan that achieves those concentrations.*" Although concentrations of iron and manganese still exceeded ROD Performance Standards in some wells closest to the landfill, the Navy determined in 2009 that implementing a remediation plan to specifically address iron and manganese concentrations was not warranted for the following reasons: Iron and manganese concentrations have generally decreased from 1991 until the present. Iron and manganese are National Secondary Drinking Water Regulations (NSDWR) under the Safe Drinking Water Act, and these constituents are considered secondary standards and exist to address aesthetics (i.e., odor and appearance) of groundwater, not human health risk or adverse environmental impacts. While the performance standards in the ROD may have been based on human health risk, the NSDWR standards are much lower and are not enforceable by EPA, which is the lead regulator for this site. Note that MDE deferred regulatory oversight to EPA in the Record of Decision of 2000. Recent iron and manganese results for 1-GW-3 and 1-GW-8 are less than the maximum levels previously detected in these monitoring wells and ROD Performance Standards for these substances are being met in downgradient monitoring wells located near the property boundary. These results lend additional evidence that the ESD (2009), eliminating the requirement for active remediation, is still supported by the site groundwater data. The ESD requires that monitoring of groundwater remains as prescribed in the ROD until ROD Performance Standards are achieved, or reviews of the monitoring program during subsequent Five-Year Reviews demonstrate the need to modify the monitoring program.

Although the ROD did not specify requirements for landfill gas monitoring, in 2004 the Maryland Department of Environment (MDE) requested a landfill gas monitoring plan for the OBL. As a result, the Navy conducted a landfill gas investigation in 2005, and monitoring of methane gas has been conducted routinely by the property owner, BDC, since that time.

Monitoring of landfill gas within the boundary of the landfill, as required by MDE, has revealed that concentrations remain in compliance with Code of Maryland Regulation (COMAR) 26.04.07.03B (9). However, concentrations of explosive gases in gas probes adjacent to the southwestern portion of the landfill boundary (GP-6, GP-7, GP-16, GP-17, GP-18, and GP-19) exceeded 100% of the Lower Explosive Limit (LEL). Concentrations have exceeded the 25% LEL for methane in GP-6 and GP-7 from December 2007 to present. Additional probes were installed in this area (GP-16 through GP-19) and sampled throughout 2015. Samples from these probes occasionally exceeded 100% LEL during the 2015 sampling events. According to previous reports, it is believed that the western channel acts as a discharge location to vent methane and other gases due to its lower elevation relative to the landfill, and gravel and stone that line the channel (*Methane Monitoring Plan for OBL, Apex Companies, 2010*). Additionally, 100% LEL methane concentrations were occasionally exceeded in probe GP-12; however, no consistent trends were identified. Probe GP-12 is located near the property boundary along Route 276. Currently, there are no structures within the vicinity of the landfill; therefore, the 25% LEL for methane screening level for nearby structures is not applicable.

The Navy has completed a methane investigation at the site and plans to install a methane mitigation system in 2016. The system includes a methane interception trench with flares for venting.

Site 2 - Fire Training Area

The RAOs are being achieved through the implementation of ICs and ROD Performance Standards for acceptable concentrations of iron and manganese in groundwater. The concentration of iron in monitoring well 2-GW-2 has generally decreased since monitoring began in 1991. The iron concentrations in well 2-GW-5 and manganese concentrations in wells 2-GW-2 and 2-GW-5 have not consistently declined; however, the most recent results are less than maximum iron and/or manganese levels previously detected in these monitoring wells. The ICs are effective in preventing potable use of groundwater; however, the ROD stated that if the ROD Performance Standards were not met at the FTA within the first five years following finalization of the ROD, then a remediation plan would be implemented to achieve those standards.

Iron and manganese are NSDWR under the Safe Drinking Water Act, and these constituents are considered secondary standards and exist to address aesthetics (i.e., odor and appearance) of groundwater, not human health risk or adverse environmental impacts. NSDWRs are not enforceable by EPA. Based on data analysis, the Navy concluded that implementing active remediation to address concentrations of iron and manganese was not currently needed because there is progress toward meeting ROD Performance Standards under naturally occurring conditions.

The 2009 ESD (JMWA, 2009) also modified the requirement to implement active remediation of groundwater for the FTA. The ESD requires that groundwater monitoring at the FTA continue until ROD Performance Standards are achieved, or reviews of the monitoring program during subsequent Five-Year Reviews demonstrate the need to modify the monitoring program.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from CERCLIS)*: Former Naval Training Center Bainbridge		
EPA ID *(from CERCLIS)*: MDD985397256		
Region: 3	**State: MD**	**City/County: Cecil County**

SITE STATUS	
NPL status: Not Listed	
Remediation status (choose all that apply): Complete	
Multiple OUs?* NO	**Construction completion date:** Site 1: Old Base Landfill – February 2000 Site 2: Fire Training Area – February 2000
Has site been put into reuse? NO	

REVIEW STATUS
Lead agency: Department of the Navy
Author name: Naval Facilities Engineering Command (NAVFAC) Washington with support from KGS and Tetra Tech, Inc.
Review period: August 2010 to August 2015
Date(s) of site inspection: 01 / 15 / 2015
Type of review: Post-SARA, Non-NPL Remedial Action Site
Review number: 3
Triggering action: Previous Five-Year Review Report
Triggering action date *(from CERCLIS)*: August 2010
Due date *(five years after triggering action date)*: August 2015

Five-Year Review Summary Form (continued) Issues:

Site 1: OBL

- No issues.

Site 2: FTA

- No issues.

Five-Year Review Summary Form
(continued) Recommendations and Follow-Up Actions:

Site 1: OBL

- Groundwater monitoring and enforcement of ICs should continue to be implemented as specified in the ROD and the 2009 ESD until ROD Performance Standards for iron and manganese are met.
- Landfill gas monitoring should continue to ensure compliance with COMAR 26.04.07.03B (9).
- Groundwater monitoring should be continued in accordance with the requirements of the latest Long-Term Monitoring Plan (LTMP) Update.
- Groundwater monitoring wells that are no longer used should be abandoned per MDE regulations via a licensed Maryland well driller.
- The IC to prevent consumption of groundwater should continue to be enforced.
- Engineering controls (ECs), including gates, fences, signs and the landfill cap should be maintained as needed to ensure protectiveness of the remedy.
- The Navy and the current property owner, Bainbridge Development Corporation (BDC), should address the recommendations and ensure the protectiveness of the remedy at the OBL in accordance with the existing legal agreements with respect to the responsibilities of each party.

Site 2: FTA

- Groundwater monitoring and enforcement of ICs should continue to be implemented as specified in the ROD and the ESD until ROD Performance Standards for iron and manganese are met.
- Groundwater monitoring should be continued in accordance with the requirements of the latest LTMP Update.
- The ICs to prevent consumption of groundwater should continue to be enforced.
- The Navy and the current property owner (BDC) should address the recommendations and ensure the protectiveness of the remedy at the FTA in accordance with the existing legal agreements with respect to the responsibilities of each party.

Protectiveness Statement(s):

Institutional controls (ICs), specifically groundwater use restrictions, have been effective for both the OBL and FTA to prevent exposure to groundwater contaminants identified in the ROD. The OBL cap and additional engineering controls, such as fences, gates and signage, are effective in containing wastes and preventing exposure to humans and the environment. The results of long-term monitoring of groundwater have shown that ROD Performance Standards have been achieved in some wells, but continue to be exceeded in other wells in close proximity to the individual sites. At the OBL, the ROD Performance Standards are being met before groundwater migrates beyond the property boundary.

As a result of the 2005 Five-Year Review of groundwater monitoring data relative to ROD Performance Standards, the Navy issued an ESD in 2009. The ESD modified the remedy by eliminating the requirement for active remediation to meet the ROD Performance Standards, and reinforced continuation of institutional controls, engineering controls, and long-term monitoring until groundwater ROD Performance Standards are achieved. The modifications as a result of the ESD are consistent with the remedial action objectives for both the OBL and the FTA and the remedy remains protective of human health and the environment. Additionally, landfill gas monitoring will continue at the OBL to ensure that methane concentrations remain within acceptable limits and are not migrating offsite, as set forth in COMAR 26.04.07.038 (9).

Other Comments:

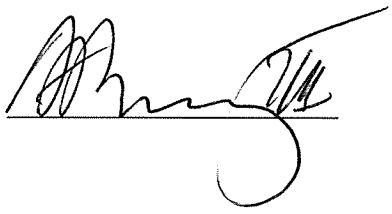
The remaining contaminants still monitored and detected in groundwater above the ROD Performance Standards are iron and manganese. The ROD Performance Standards for iron and manganese are site-specific risk-based ARARs.

Next Review:

The next Five-Year Review will be completed in 2020.

Signature of U.S. Department of the Navy and Date

F.F. BURGESS III
Commanding Officer NAVFAC Washington



6/16/16
Date

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Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
BDC	Bainbridge Development Corporation
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Constituent of Concern
COMAR	Code of Maryland Regulation
ESD	Explanation of Significant Differences
ECs	engineering controls
FTA	Fire Training Area
FOST	Finding of Suitability to Transfer
FS	Feasibility Study
HQ	hazard quotient
HVB	Happy Valley Branch
IC	institutional controls
IR	Installation Restoration
IRMs	Interim Remedial Measures
KGS	KOMAN Government Solutions, LLC
LTMP	long-term monitoring plan
LEL	lower explosive limit
µg/L	micrograms per liter
MDE	Maryland Department of the Environment
NAVFAC	Naval Facilities Engineering Command
NCP	National Contingency Plan
NSDWR	National Secondary Drinking Water Regulations
NTCB	Naval Training Center - Bainbridge
NPL	National Priorities List
OBL	Old Base Landfill
O&M	operation and maintenance
OU	Operable Unit
RA	Remedial Action
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
USACE	U.S. Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1.0 Introduction

Naval Facilities Engineering Command (NAVFAC) Washington (Navy) conducted this Five-Year Review for the former Naval Training Center – Bainbridge (NTCB) in Port Deposit, Maryland, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with the U.S. Environmental Protection Agency (USEPA) guidance titled *Comprehensive Five-Year Review Guidance,* dated June 2001 and the USEPA Memorandum *Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews* dated September 2012. This Five-Year Review document for former NTCB addresses remedies and remedial actions (RAs) that have been implemented at two sites for which there is a Record of Decision (ROD) in place for constituents remaining at concentrations that do not allow for unrestricted use and unlimited exposure. The ROD for NTCB addresses Site 1 - Old Base Landfill (OBL) and Site 2 - Fire Training Area (FTA).

The objective of this Five-Year Review is to evaluate current remedies at the OBL and FTA to determine whether the remedies remain protective of human health and the environment in accordance with the requirements set forth in the ROD and subsequent Explanation of Significant Differences (ESD). The evaluation of the protectiveness of the remedies consisted of a thorough review of various reports and documents pertaining to site activities and findings, site inspections, and interviews with appropriate regulatory, Navy, and Bainbridge Development Corporation (BDC) personnel. The methods, findings, and conclusions presented in this Five-Year Review report are intended to identify any issues that may prevent a particular remedy from functioning as designed or as appropriate to protect human health and the environment.

The Navy is preparing this Five-Year Review report pursuant to CERCLA 121 and the *National Contingency Plan* (NCP). CERCLA Section 121 states:

> "If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."

The USEPA interpreted this requirement further in the NCP, as stated in 40 Code of Federal Regulations (CFR) 300.430 (f)(4)(ii):

> "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."

KOMAN Government Solutions, LLC (KGS) analyzed the available information in support of the Five-Year Review under Contract Number N40080-12-D-0451 Task Order Number 0007. Representatives of NAVFAC and KGS conducted a site inspection on 15 January 2015. This report documents the results of the Five-Year Review.

This is the third Five-Year Review for the OBL and FTA sites at the former NTCB. The first

Five-Year Review for NTCB was completed in 2005. The second Five-Year Review was completed in 2010 (CH2M Hill, 2011) and is the triggering action for this statutory review. The current Five-Year Review is required because site constituents remain in environmental media at concentrations exceeding criteria that allow for unlimited use and unrestricted exposure.

2.0 Site Chronology

In 1987, the OBL and FTA were identified by the Navy as areas where environmental contamination may have resulted from past NTCB operations and disposal practices. Versar, Inc. performed a hydrogeologic investigation in 1988 to assess potential impacts to surface water, groundwater, and stream sediments from prior Navy activities (Versar, 1988).

In 1990, a Remedial Investigation (RI) for the OBL and FTA was initiated for the Navy by Ecology and Environment, Inc. (E&E, 1999a). Initial fieldwork for the RI was conducted in 1990 and 1991. A second phase of the RI was conducted between 1993 and 1994 to fully characterize the nature and extent of contamination at both Installation Restoration (IR) Sites. Human and ecological risk assessments were conducted in 1994 prior to completion of the Interim Remedial Measures (IRMs), and again in 1999 several years following IRM implementation.

IRMs were completed from July 1994 to June 1995 that consisted of delineation of contamination, removing contaminated soils from the FTA, consolidating outlying contamination from around the landfill, capping the OBL, and conducting confirmation sampling. The IRMs were completed by OHM Remediation Services Corporation (OHM). The purpose of the IRMs was to: 1) prevent direct contact with contaminants and waste in the OBL as well as to prevent precipitation from infiltrating into the landfill, which could cause contaminants to migrate into the groundwater; and 2) remove the source of contamination at the FTA (OHM, 1997). Due to a partial failure of the cap cover soil after heavy rains in 1998, extensive repairs to the OBL cap were completed in 1999.

A Feasibility Study (FS) was completed in 1999 (E&E, 1999b). During the study, three remedial alternatives were developed for each site, specifically 1) no action; 2) institutional controls (IC) with monitoring; and 3) active remediation. The selected remedy was alternative 2, ICs with monitoring.

The results of the IRMs, RI, and FS were incorporated into the *Proposed Remedial Action Plan*, which was released for public comment in October 1999. The results of the public comment period, including written and verbal comments, were incorporated into the ROD, which was issued in February 2000.

The selected remedy, as documented in the ROD, is ICs with monitoring. Under this remedy, ICs would be implemented to provide 1) site-specific deed restrictions preventing intrusive activities on the cap of the OBL; 2) a deed restriction preventing the use of groundwater for potable water supplies for the entire NTCB facility (EA, 2000). Additionally, a long-term monitoring program for environmental media is required pending evaluation during each five year review.

The *Finding of Suitability of Transfer* (FOST) was finalized on 10 February 2000, at which time the Bainbridge property was approved for transfer from the Navy to the BDC. The 60 remaining buildings and land were formally transferred to the BDC on 14 February 2000 via a Quitclaim Deed. The Navy relinquished responsibility for operation and maintenance of the OBL and FTA, including groundwater, surface water, and sediment monitoring, to the BDC in February 2005 as stipulated in the Quitclaim Deed.

In August 2005, J.M. Waller Associates (JMWA) completed the initial Five-Year Review, evaluating the effectiveness of the remedy selected in the ROD for NTCB. It was determined that the final remedies were protective of human health and the environment based on preventing consumption of groundwater. Exposure to contaminants was prevented by the ICs , which

include deed restrictions, and operations and maintenance (O&M) inspections, and engineering controls (EC), specifically gates, fences, signs, and a landfill cap (JMWA, 2005a). Remedial Action Objectives (RAOs) include preventing humans from consuming groundwater and preventing ecological receptors from being exposed to pesticides and metals in sediment and surface water. The exposure assumptions, toxicity data, and ROD Performance Standards used at the time of the final remedy selection were determined to still be valid in 2005.

Following the recommendations of the 2005 Five-Year Review and a 2004 request for landfill gas monitoring by the Maryland Department of the Environment (MDE), a *Final Landfill Gas Investigation Report* was completed for the OBL by JMWA. The event included field screening of 33 landfill gas vents, an assessment of site geology and landfill cap construction details, and an assessment of landfill gas migration. The investigation concluded that methane concentrations were in compliance with Code of Maryland Regulation (COMAR) 26.04.07.03B (9) (JMWA, 2005b) at that time.

In September 2005, based on recommendations in the 2005 Five-Year Review report, Shaw Environmental, Inc. (Shaw) was contracted by the Navy to perform the necessary repairs and associated tasks at the NTCB. In addition to general maintenance, ten gas monitoring probes were installed at the OBL and all monitoring wells at the FTA were properly abandoned, except for wells 2-GW-2 and 2-GW-5 (Shaw, 2005), which are included in the long-term monitoring.

In November 2005, also based on recommendations in the 2005 Five-Year Review report, a *Surface Water and Sediment Monitoring Report* was completed for Site 1 (OBL). Results were compared to surface water and sediment data from 1991, 1994, and 1999. The conclusion of this investigation was that contaminant concentrations for all classes of chemicals had decreased substantially from 1991 through 2005, and data indicated a continuing decreasing trend (JMWA, 2005c).

As part of the 2005 *Surface Water and Sediment Monitoring Report*, a limited ecological risk evaluation was also completed. The evaluation updated the hazard quotient (HQ) values calculated in 1999 by using the 2005 surface water and sediment concentrations and currently available exposure and toxicity data. The evaluation concluded that although some constituent HQs remained above 1.0 throughout the monitoring period, HQs for most constituents had decreased considerably and declining trends were evident. Additionally, both tributaries surrounding the OBL offered a limited habitat for ecological receptors (JMWA, 2005c) (e.g. rip-rap lined stream channel).

To ensure the protectiveness of RAOs outlined in the ROD, a long-term monitoring plan (LTMP) Update was completed in 2006 (NAVFAC), and was based on the findings presented in the *Surface Water and Sediment Monitoring Report* (JMWA, 2005c). The LTMP Update recommended sampling frequency changes for monitoring well locations where constituent concentrations have remained consistently below the groundwater ROD Performance Standards set forth in the ROD. Additionally, it was recommended that surface water and sediment monitoring be removed from the LTMP altogether based upon current site conditions that include incomplete exposure pathways and poor ecological habitat (NAVFAC, 2006).

In May 2007, the U.S. Army Corps of Engineers (USACE) completed a *Landfill Investigation Report for Site 1* (OBL). Field activities included a topographic survey, down-hole camera inspection of the gas vents, and a landfill gas survey (USACE, 2007). Shaw completed the major field activities associated with this effort, including the replacement of riser pipes on 35 landfill gas vents, sub-grade repairs to the gas vents, installation of five additional landfill gas monitoring probes, repairing the cap on monitoring well 1-GW-1 well, and site restoration

(Shaw, 2008).

In July 2007, based on a 2004 request by MDE, landfill gas monitoring was initiated at the OBL. MDE requires long-term monitoring of methane to ensure continued compliance with COMAR 26.04.07.03B (9) (MDE, 2004).

Although concentrations of iron and/or manganese still exceed ROD Performance Standards in some wells, the Navy determined in 2009 that implementing a remediation plan to specifically address iron and manganese concentrations was not warranted. Aside from wells 1-GW-3 (iron and manganese), 1-GW-8 (manganese), 2-GW-2 (manganese), and 2-GW-5 (iron and manganese); concentrations have generally decreased from 1991 until the present (refer to Tables 1-3 and Tables 6-7.) In monitoring wells where iron and/or manganese did not exhibit such a decreasing trend, the most recent results are less than the maximum concentrations previously detected. ROD Performance Standards for these substances are being met in downgradient OBL monitoring wells located near the property boundary. While the performance standards in the ROD are based on human health risk, iron and manganese are National Secondary Drinking Water Regulations (NSDWR) under the Safe Drinking Water Act, and these constituents are considered secondary standards and exist to address aesthetics (i.e., odor and appearance) of groundwater, not human health risk or adverse environmental impacts. NSDWRs are not enforceable. Based on historical data analysis, the Navy concluded in 2009 that implementing active remediation to address concentrations of iron and manganese was not currently needed because there is progress toward meeting ROD Performance Standards under naturally occurring conditions.

The following is a site chronology of key events pertaining to the NTCB facility.

Date	Event
1942	Former NTCB constructed
1976	Former NTCB formally closed
1987	OBL and FTA identified as potential areas of environmental concern
December 1988	Hydrogeologic investigation performed
1990—1991	First phase of RI performed
1990	Major building demolition project performed
1993-1994	Second phase of RI performed
July 1994—June 1995	IRMs performed
February 1999	RI completed
September 1999	FS completed
December 1999	OBL repairs completed
February 2000	ROD completed
February 2000	FOST completed
February 2000	Former NTCB transferred to BDC
April 2000—present	Semi-annual groundwater monitoring
May 2004	MDE request for landfill gas monitoring at OBL; Navy completed Landfill Gas Investigation Report
February 2005	Navy completed operation and maintenance responsibilities
August 2005	First Five-Year Review completed
July 2005	Landfill Gas Investigation Report
September 2005	Shaw completed maintenance and general repairs, based on the Five- Year Review
November 2005	Evaluation of surface water and sediment as potential exposure pathways
June 2006	Navy completed an LTMP Update
May 2007	USACE Landfill Investigation Report, maintenance and general repairs by Shaw
July 2007—present	Landfill gas monitoring executed at the request of the MDE
May 2009	ESD completed
December 2010	Methane Monitoring Plan completed for BDC and MDE
February 2011	Second Five-Year Report completed
February 2011	Long Term Monitoring Plan updated
March 2014	Most recent LTMP sampling conducted
May 2014	Additional gas monitoring probes installed
January 2015	Navy begins monthly gas monitoring investigation
December 2015	Navy completes monthly gas monitoring investigation
June 2016	Navy Submits Methane Mitigation System Work Plan

3.0 Background

3.1 Facility Background

The former NTCB is situated on approximately 1,185 acres in Cecil County, Maryland, located northeast of the town of Port Deposit (**Figure 1**). NTCB was constructed in 1942 as a training center for World War II Navy recruits. The facility was partially deactivated after World War II, but experienced major activity at the beginning of the Korean crisis in 1951. In the post-war years, NTCB became the host for various schools and functions, including the Naval Preparatory School, the Nuclear Power School, the Naval Reserve Manpower Center, WAVES Headquarters, and a U.S. Naval Hospital.

Operations at NTCB were reduced in 1972, and NTCB was formally closed in 1976. The Navy retained ownership, although no Navy operations have been conducted since 1976. The Department of Labor operated a Job Corp Training Center on part of the installation until 1990.

Over 700 buildings and other structures were once located on NTCB prior to the initiation of a building demolition project in 1990. At this time, approximately 60 structures remain onsite. NTCB is in a general state of disrepair; many of the remaining structures have been damaged by weather and/or vandals. Several portions of NTCB are overgrown with vegetation.

3.2 Land and Resource Use

NTCB is located near the contact zone where the crystalline metamorphic rocks of the Piedmont "foothills" are overlaid by the unconsolidated sedimentary deposits of the Coastal Plain. The Coastal Plain deposits are typically stratified layers of sand, gravel, silt, and clay that overlie the crystalline metamorphic rocks and form a wedge that regionally thickens to the southeast. Sedimentary deposits only occur in the northern one-third of the base. Due to the discontinuous nature and limited areal extent of the Coastal Plain sediments, these are not principal aquifers at OBL and FTA. The fractured crystalline rocks beneath NTCB and the surrounding area are the primary aquifers. The crystalline rocks are relatively non-porous, but the ability to store and transmit water increases as the number of fractures, the size of the fracture openings, and the interconnectedness of fractures increase.

Precipitation infiltrates the soil column and migrates vertically downward through soil toward the soil/bedrock interface until it reaches the water table where it moves under the influence of gravity and discharges to streams, rivers, and other surface water bodies.

Infiltrating precipitation can move as groundwater through the weathered zone above the crystalline bedrock aquifers, discharge to surface water, or directly recharge the fracture system of the underlying aquifers. Thus, streams and springs receive most groundwater discharge from the local groundwater flow system. Conceptually, streams and springs can be viewed as no-flow hydraulic boundaries where groundwater and contaminant flow paths terminate upon discharge from the aquifer to enter the surface water system.

Consequently, the OBL and FTA can be viewed as isolated sources within separate groundwater discharge basins. Both are bounded by up-gradient groundwater recharge divides and down-gradient by the nearby streams.

The town of Port Deposit, located down-gradient of NTCB, uses the Susquehanna River for its source of drinking water. The intake pipe for the Port Deposit water supply is located upstream of any potential NTCB discharges. There are no known private or public water supply wells affected by OBL or FTA.

Future land use plans are currently being developed for NTCB, and potential future land use may

be industrial, residential, office, retail, recreational and hotel/conference center, or educational facilities. For the OBL site, in order to protect the integrity of the impermeable cap and preserve immediately adjacent areas, the only permissible future use is low impact recreation. In particular, any activity that compromises or penetrates the cap, or causes stress to vegetation, is not viable with methane present. The use of groundwater for any use other than non-potable industrial processes is restricted for the entire former NTCB facility. Other than the restriction on groundwater use, there are no other restrictions on the future uses of the FTA.

3.3 Site-Specific Background

3.3.1 Site 1, Old Base Landfill

The Site 1, OBL, is located on the northwestern boundary of the NTCB, adjacent to and separated from Route 276 by a facility fence and a small-unnamed stream (**Figure 2**). The OBL was a solid waste landfill that operated from 1942 until base closure in 1976. Disposal activities were unregulated during that period and the landfill is unlined.

Although disposal records were not kept, it is known that pesticides and asbestos-transite laden building debris were disposed at the site. In 1995, the landfill was capped as an IRM. Repairs and extensions to the cap were made in 1999.

3.3.2 Site 2, Fire Training Area

The Site 2, FTA, is located in the southeastern portion of the NTCB and bounded by Happy Valley Branch (HVB) near Maryland Route 222 (**Figure 2**). The FTA was used to train Navy recruits in firefighting techniques from the 1940s until the late 1960s.

The training involved spraying buildings with oil and igniting them. When the flames were extinguished with water, oil and water run-off drained into two subsurface concrete vaults at the southwest corner of the concrete pad. Overflow from the vaults went into an oil-water separator pit, then through a subsurface valve and piping system, discharging into a shallow ditch leading to HVB. In 1994-1995, 37,950 cubic yards of oil, debris, and pesticide-contaminated soil were excavated as an IRM. Soil excavated from FTA was transported to the OBL for disposal under an impermeable landfill cap. The former oil- water separator pit was restored as a wetland.

Recently, EPA has identified perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) which are components of aqueous film-forming foam (AFFF) as emerging contaminants at fire training sites. The Navy developed AFFF in the mid-1960s. While groundwater is prohibited from potable use at Site 2; an approach, if any, for a PFOS and PFOA evaluation will be determined prior to the next Five Year Review in 2020.

4.0 Remedial Actions

4.1 Remedy Selection

The ROD was signed in February 2000. The selected remedy specified in the ROD was ICs and long-term monitoring of groundwater, surface water, and sediment. The FS for this site documented comparison of the three alternatives (E&E, 1999b) with the threshold, modifying, and balancing criteria required under CERCLA. The IC alternative addresses unacceptable human health risks associated with elevated iron and manganese concentrations in groundwater at OBL and FTA by establishing deed restrictions preventing potable use of groundwater. ICs restricting intrusive activities at the landfill are also in place to protect human health and the environment by preventing direct contaminant exposure to human receptors, and indirect exposure to ecological receptors as a result of erosion and transport of landfill waste to the down-gradient streams. Restricting intrusive activities on the landfill is intended to protect the integrity of the landfill cap. Additionally, a LTMP was developed for groundwater, surface water, and sediment at the OBL. The effectiveness of the OBL and FTA remedies is evaluated every five years as part of the CERCLA process.

4.2 Basis for Remedial Action

The OBL was used for the disposal of wastes from 1942 until approximately 1976, when NTCB was closed. The disposal activities were unregulated and the landfill was unlined. The FTA was used to train Navy recruits in firefighting techniques from the 1940s until the late 1960s. An RI was performed at each site between 1990 and 1994, and IRMs were implemented in July 1994 and June 1995. The IRM for the OBL consisted of consolidating wastes at the OBL and designing and installing an engineered cap to prevent direct exposures and limit infiltration of precipitation and subsequent leaching of contaminants from waste material. Contaminants resulting from former fire training activities at the FTA were removed by excavating contaminated soil.

Post-IRM environmental sampling has shown reductions in contaminant concentrations over time. However, post-IRM human and ecological risk assessments indicated that unacceptable non-carcinogenic risks remain for drinking water. The unacceptable risks are driven by elevated concentrations of iron and manganese in groundwater at both IR Sites.

A summary of the individual sites, results of investigations, and risk assessment results are presented in the ROD for NTCB, as well as in the initial *Five-Year Review Report* (JMWA, 2005). Groundwater sampling locations and site features for the OBL are shown on **Figure 3** and **Figure 4**. Groundwater sampling locations and site features for the FTA are shown on **Figure 5**.

4.2 Remedial Action Objectives

A detailed analysis of the possible remedial alternatives for the former NTCB was presented in the FS (E&E, 1999b). The analysis was conducted in accordance with the USEPA document titled, "*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*" (USEPA, 1988) and the NCP.

The RAOs for the OBL and FTA, as presented in the ROD, are stated below. The exposure assumptions, toxicity data, and ROD Performance Standards used at the time of the final remedy selection are still valid.

4.2.1 OBL

The RAOs for the OBL are:

- Prevent humans from consuming groundwater contaminated with manganese, iron, and chlorobenzene.
- Prevent ecological receptors from being exposed to pesticides and metals in sediment and surface water.

4.2.2 FTA

The RAO for the FTA is:

- Prevent humans from consuming groundwater contaminated with manganese and iron.

4.3 Remedy Implementation

The selected remedy was intended as a follow-on action to the 1994-1995 IRMs. This involved the implementation of ICs in the form of facility-wide deed restrictions at the time of property transfer to prohibit the use of groundwater as a potable source. Deed restrictions also prohibit construction or any other type of disturbances on the landfill which may compromise the integrity of the OBL cap. The ICs were further described in the FOST (Navy, 2000). The restrictions on the property were added to the transfer deed, which was executed on 11 February 2000. The ICs include a clause that allows the Navy access to the property to conduct activities such as, but not limited to, monitoring, testing, well drilling, and surveying, as necessary. Additionally, the ROD required the development and execution of a LTMP for groundwater, surface water, and sediment at both the OBL and FTA. An update to the LTMP was completed in 2006, which eliminated surface water and sediment from the plan based on the findings of the 2005 limited ecological risk assessment. Data from the LTMP is required to be reviewed every five years as part of the CERCLA Five-Year Review process.

No future land use plan has been finalized for NTCB; therefore, potential future land uses include industrial, residential, office, retail, recreational and hotel/conference center, or educational facilities. At the OBL, in order to protect the integrity of the impermeable cap, the only permissible future use is recreation. In particular, no activity that compromises or penetrates the cap will be allowed. The use of groundwater for any purpose other than non-potable industrial processes will be restricted. At the FTA, use of groundwater for any purpose other than non-potable industrial processes is also restricted. There are no other restrictions on the future land uses of the FTA. Potential future land uses include industrial, residential, office, retail, recreational and hotel/conference center, or educational facilities.

4.4 Explanation of Significant Difference

Although concentrations of iron and/or manganese still exceed ROD Performance Standards in some wells, the Navy determined that implementing a remediation plan to specifically address iron and manganese concentrations was not warranted. Aside from 1-GW-3 (iron and manganese), 1-GW-8 (manganese), 2-GW-2 (manganese), and 2- GW-5 (iron and manganese); iron and manganese concentrations have generally decreased from 1991 until the present. In monitoring wells where iron and/or manganese did not exhibit a decreasing trend, the most recent results are below maximum levels previously detected. ROD Performance Standards for these substances are being met in downgradient OBL monitoring wells located near the property boundary. Iron and manganese are NSDWR under the Safe Drinking Water Act, and these constituents are considered secondary standards and exist to address aesthetics (i.e., odor and appearance) of groundwater, not human health risk or adverse environmental impacts. NSDWRs are not enforceable. Based on data analysis, the Navy concluded that implementing active

remediation to address concentrations of iron and manganese was not currently needed because there is progress toward meeting ROD Performance Standards under naturally occurring conditions.

The Navy issued an ESD in 2009 (JMWA, 2009) to modify the ROD because the monitoring data showed improving groundwater quality. The recommended change to the ROD that was documented by the ESD eliminated the requirement for an active remediation, and continued groundwater monitoring as necessary to verify constituent concentrations (COCs) continue to decrease until ROD Performance Standards are achieved for all constituents of concern. The remedy of ICs with monitoring ensures there is no exposure or unacceptable risk to potential receptors. The ESD requires groundwater monitoring continue as prescribed in the ROD until ROD Performance Standards are achieved or reviews of the monitoring program during subsequent Five-Year Reviews demonstrate the need to modify the monitoring program.

4.5 Remedial System Operation and Maintenance

There are currently no active remedial systems in operation at the OBL and FTA. The remedy for each site consists of ICs with groundwater monitoring. Operation and maintenance costs have included only those costs associated with long-term monitoring of groundwater at both sites and methane monitoring at the OBL, as well as mowing and site inspection costs. The ROD identified annual monitoring costs in the range of $18,000 to $35,000; however, the monitoring requirements have changed since the ROD was prepared, as documented by the ESD (JMWA, 2009). According to the current property owner (BDC), annual costs for monitoring at the OBL and FTA are approximately $30,700. This includes groundwater sampling, methane monitoring, and inspections.

5.0 Progress since the Last Five-Year Review

Following the recommendations of the 2010 Five-Year Review and the LTMP Update (NAVFAC, 2011), changes were made to the long-term groundwater monitoring program. Also, additional changes were made to the landfill gas monitoring program based on this report and subsequent gas measurements.

The groundwater monitoring program included the following revisions:

- Sampling frequency was changed to once every 15 months, in order to capture any seasonal variation in sampling;
- OBL MWs 1-GW-6, 1-GW-7, 1-GW-10, and 1-GW-11 were deleted from the monitoring network based on consistent concentrations below the ROD Performance Standards;
- OBL MW 1-GW-13 was added to the network to monitor downgradient water chemistry;
- OBL MWs 1-GW-3, 1-GW-5, 1-GW-8, and 1-GW-9 were kept in the network;
- Chlorobenzene was no longer required based on multiple rounds of data showing the performance standard for chlorobenzene was not exceeded in any wells;
- No changes, other than sampling frequency, occurred for the FTA (wells 2-GW-2 and 2-GW-5 were still sampled).

To comply with the ongoing MDE COMAR requirement (COMAR 26.04.07.03B (9) for landfill monitoring, the gas monitoring program continued with the quarterly measurements of the gas probes (GP-1 through GP-15) located outside the perimeter of the OBL boundary. In May 2014, 11 additional gas probes were installed (GP-16 through GP-26) along the western side of the landfill to monitor consistently elevated readings in gas probes GP-6, 7, and 12.

6.0 Five-Year Review Process

6.1 Administrative Components

The USEPA and MDE were notified of the initiation of the Five-Year Review in January 2015. The OBL and FTA Five-Year Review team was led by Mr. Joseph Rail, the Remedial Project Manager (RPM) for the Navy. KGS prepared the Five-Year Review document under contract to, and on behalf of, the Navy.

The components of the Five-Year Review process include the following:

- Community involvement
- Document review
- Data review
- Site inspection
- Five-Year Review report preparation and review

6.2 Community Involvement

A public notice was published in the *Cecil Whig* newspaper and its online companion, www.cecildaily.com, on 11 February 2015, stating that a Five-Year Review is being conducted for the OBL and FTA at the former NTCB facility.

Upon completion of this Five-Year Review, a notice will be sent to the same news outlets indicating that the Five-Year Review report is complete and will be available to the public at the local Information Repository at the Elkton Branch of the Cecil County, Maryland Public Library.

6.3 Document Review

The Five-Year Review consisted of a review of relevant investigation and decision documents, including monitoring results. The documents reviewed include the following:

- Bainbridge Development Corporation, 2010. *Five-Year Review (2005-2010 Apex Environmental Monitoring Summary) Report – Old Base Landfill, Port Deposit, Maryland.*
- CH2M Hill, 2011. *Five-Year Review Report for IR Site 1(Old Base Landfill) and IR Site 2 (Fire Training Area), Former Naval Training Center, Bainbridge, Port Deposit, Maryland. Final.* February.
- EA Engineering, Science, and Technology (EA), 2000. *Record of Decision IR Sites 1 and 2 (Old Base Landfill and Fire Training Area) for the Naval Training Center, Bainbridge, Port Deposit, Maryland*. Final. February.
- H&S Environmental, Inc., 2015. *Methane Monitoring Results for January 2015 at Site 1 – Old Base Landfill Former Naval Training Center Bainbridge, Port Deposit, MD*. January.
- H&S Environmental, Inc., 2015. *Methane Monitoring Results for February 2015 at Site 1 – Old Base Landfill Former Naval Training Center Bainbridge, Port Deposit, MD.* February.
- J.M. Waller Associates (JMWA), 2005a. *Five-Year Review for IR Sites 1 and 2 (Old Base Landfill and Fire Training Area), Former Naval Training Center, Bainbridge, Port Deposit, Maryland. Final.* August.

- J.M. Waller Associates (JMWA), 2005b. *Landfill Gas Investigation Report for IR Site 1(Old Base Landfill), Former Naval Training Center, Bainbridge, Port Deposit, Maryland. Final.* July.
- J.M. Waller Associates (JMWA), 2009. *Explanation of Significant Differences for IR Sites 1 and 2 (Old Base Landfill and Fire Training Area), Former Naval Training Center, Bainbridge, Port Deposit, Maryland. Final.* May.
- NAVFAC Washington, 2011. *Long Term Monitoring Plan Update, Old Base Landfill and Fire Training Area (Sites 1 and 2), Former Naval Training Center-Bainbridge, Port Deposit, MD.* February.
- U.S. Environmental Protection Agency (USEPA), 2001. *Comprehensive Five-Year Review.*
- Shaw Environmental, Inc. (Shaw), 2008. *Closeout Report, Landfill Repairs at Site 1 Old Base Landfill, Former Naval Training Center, Bainbridge, Port Deposit, Maryland. Final.* January.
- U.S. Army Corps of Engineers (USACE), 2007. *Landfill Investigation Report for IR Site 1(Old Base Landfill), Former Naval Training Center, Bainbridge, Port Deposit, Maryland. Final.* May.
- U.S. Environmental Protection Agency (USEPA), 2012. *Memorandum-Clarifying the Use of Protectiveness Determinations for CERCLA Five-Year Reviews.* Washington. D.C. September.

6.4 Data Review

6.4.1 Background

To meet the long-term monitoring requirements of the ROD, groundwater monitoring has been performed at both the OBL and FTA since April 2002, and is ongoing. The monitoring is intended to determine whether ROD Performance Standards specified in the ROD are being achieved and/or maintained. Groundwater monitoring had been conducted through 2014, in accordance with the LTMP dated 29 November 1999, the 2006 LTMP Update, and the 2011 LTMP Update (NAVFAC, 2011).

Groundwater sampling locations at the OBL and FTA are shown on **Figure 3** and **Figure 5**, respectively.

Landfill gas monitoring has been performed at the OBL since July 2007 to ensure the concentration of methane gas associated with the landfill remains in compliance with COMAR 26.04.07.03B (9). The landfill has thirty-three passive gas vents that were part of the original landfill cap construction in 1994-1995. Ten gas probes were installed as part of the original methane investigation. An additional 16 gas probes have subsequently been installed and monitored. The gas vent and/or gas probe locations used for monitoring are shown on **Figure 4.**

6.4.2 OBL Monitoring Data Review

The ROD presents ROD Performance Standards for chlorobenzene, iron, and manganese concentrations in groundwater at the OBL as 100 micrograms per liter (µg/L), 4,600 µg/L, and 300 µg/L, respectively. Concentrations of these constituents were monitored in groundwater at eight monitoring well locations from April 2002 to June 2010. Following the 2010 Five-Year Review Report, it was recommended and subsequently approved that four of these monitoring wells (1-GW-3, 1-GW-5, 1-GW-8, and 1-GW-9) and one additional well (1-GW-13) be sampled

once every 15 months to capture seasonal variations instead of annually or semi-annually. Additionally, the Apex Operations and Maintenance (O&M) sampling dated March 14, 2014 stated that, following the 2011 Five-Year Review, chlorobenzene was no longer included in the monitoring program because it had remained below the performance standard for the last five years (Apex Companies, LLC, 2014). **Tables 1 through 3** present the data from these monitoring events, as well as earlier monitoring data from 1991, 1994, and 1999, which are included to provide a perspective on the long-term trend of contaminant concentrations over time. All eight original monitoring wells and the additional monitoring well (1-GW-13) shown on **Figure 3**, are located down-gradient of the landfill. Groundwater flow direction, as determined in the RI (E&E, 1999a), is generally to the southwest.

The 2011 Five-Year Review results of long-term monitoring of groundwater showed that ROD Performance Standards for manganese, and occasionally iron, continue to be exceeded at well locations 1-GW-3, 1-GW-5, 1-GW-8 and 1-GW-9, which are in close proximity to the landfill. These wells continued to be sampled in September 2011, December 2012, and March 2014. In wells 1-GW-5 and 1-GW-9, concentrations of manganese and iron were below ROD Performance Standards for the last two sampling events, December 2012 and March 2014. Iron, which has a performance standard of 4,600 µg/L, was not detected in 1-GW-5 and 1-GW-9 during these events. Manganese, which has a performance standard of 300 µg/L, was not detected in 1-GW-9 and detected at 120 -160 µg/L in 1-GW-5 during these events. Concentrations of both manganese and iron continue to exceed the performance standard in 1-GW-3 and 1-GW-8. Concentrations of manganese and iron in 1-GW-13, which is located significantly downgradient of the landfill site boundary, were not detected for manganese and were well below the performance standard for iron.

Landfill gas monitoring is being performed at the OBL to ensure that the concentration of methane gas associated with the landfill complies with the requirements of COMAR 26.04.07.03B (9). Since there are no structures within the vicinity of the landfill, the 25% of the Lower Explosive Limit (LEL) for methane screening level for nearby structures is not applicable. The 100% LEL for methane has occasionally been exceeded in GP-12 at the nearest property boundary (**Figure 4)**. Methane monitoring data, which have been collected since July 2007 from OBL gas vents and/or gas probes, are included as **Table 4** and **Table 5**, respectively.

Monitoring of landfill gas, as required by MDE, has revealed that some concentrations do not remain in compliance with COMAR 26.04.07.03B (9). Concentrations of explosive gases in gas probes adjacent to the southwestern portion of the landfill boundary (GP-6, GP-7, GP-16, GP-17, GP-18, and GP-19) exceed 100% LEL. Concentrations have exceeded the 25% LEL for methane in GP-6 and GP-7 from December 2007 to present. Additional probes were installed in this area (GP-16 through GP-19) and sampled throughout 2015. Samples from these probes occasionally exceeded 100% LEL during the 2015 sampling events. According to previous reports, it is believed that the western channel acts as a discharge location to vent methane and other gases due to its lower elevation relative to the landfill and gravel and stone that line the channel (*Methane Monitoring Plan for OBL*, December 13, 2010). Previously, 100% LEL methane concentrations were also exceeded in well GP-12. Well GP-12 is located near the property boundary along Route 276. Since there are no structures within the vicinity of the landfill, the 25% LEL for methane screening level for nearby structures is not applicable. In order to be in compliance with COMAR 26.04.07.03B (9), the Navy plans to install a methane interception trench in the vicinity of GP-12 in 2016.

Surface water and sediment monitoring at the OBL were specified as a requirement in the ROD. An evaluation of these media was completed in 2005. Based on this evaluation, it was concluded

that contaminant concentrations for all classes of constituents had decreased significantly from 1991 through 2005, and that there was a continuing decreasing trend. Additionally, as part of the *Surface Water and Sediment Monitoring Report* (JMWA, 2005c), a limited ecological risk evaluation was performed and further supported the findings. Following this investigation, surface water and sediment monitoring were removed from the LTMP based upon current site conditions that include incomplete exposure pathways and poor ecological habitat.

6.4.3 FTA Monitoring Data Review

The ROD presents ROD Performance Standards for iron and manganese concentrations in groundwater at the FTA as 4,600 µg/L and 300 µg/L, respectively. These constituents were monitored in groundwater at two monitoring well locations from April 2002 to March 2014, as shown on **Figure 5**. Data from these monitoring events, as well as earlier monitoring data from 1991, 1994, and 1999, which is included to provide a perspective on the trend of constituent concentrations over time, is shown on **Table 6** and **Table 7**. Both of the monitoring wells, 2-GW-2 and 2-GW-5, are located down-gradient of the concrete pad and former oil-water separator pit associated with the FTA.

Since the previous Five-Year Review (2011), both manganese and iron concentrations have exceeded the ROD Performance Standards in 2-GW-5 consistently. Concentrations of manganese and iron were below the performance standard in 2-GW-2 from April 1999 to December 2006; however since July 2007 exceedances have been reported for iron occasionally and for manganese relatively consistently. Since the 2010 Five-Year Review, iron concentrations have fallen below the ROD Performance Standards in 2-GW-2; and manganese has decreased during the last two sampling events although it continues to exceed the performance standard in 2-GW-2.

6.5 Site Inspection

Representatives of the Navy and KGS conducted an inspection of both the OBL and FTA sites on 15 January 2015. The purpose of the inspection was to observe current site conditions and to identify any conditions that require action with respect to evaluating and maintaining the protectiveness of the remedy. The site inspection focused on the following:

OBL

- Condition of the landfill cap and surrounding area
- Signs of erosion or intrusive activities
- Condition of monitoring wells and gas vents/probes
- Condition of drainage features, such as drains, culverts, channels, etc.
- Integrity of ECs such as fences, gates, locks, signs, etc.
- Maintenance of ground cover
- Signs of vandalism
- Evidence of groundwater withdrawal
- Evidence of construction activities

FTA

- Overall condition of FTA area
- Signs of erosion

- Condition of monitoring wells
- Integrity of ECs such as fences, locks, signs, etc.
- Signs of vandalism
- Evidence of groundwater withdrawal

In accordance with the selected remedies for the OBL and FTA, the site inspection verified there was no evidence of groundwater being used as a potable source of water. In addition, no construction or other intrusive activities were observed on the cap of the OBL. **Appendix A** contains the site inspection checklists. Photographs taken during the site inspection are included in **Appendix B**. Inspection team rosters are presented in **Appendix C**.

6.5.1 OBL Site Inspection

The inspection consisted of walking the perimeter road of the OBL, inspecting monitoring wells, drains, gas vents, gas probes, clean-outs, and erosion issues. All monitoring wells and gas probes were inspected for integrity and security. The entire OBL area was inspected, including wooded areas, storm-water structures, perimeter fencing, and the landfill cap itself.

The landfill cap appeared to be in good condition and there were no signs of erosion, cracks, settlement, pooling water, or seeps. The vegetative cover appeared to be in good condition and had just recently been mowed. The concrete reinforced gas vents were observed to be in good condition.

The drainage structures consist of two drainage channels leading from the crest of the landfill to the toe of the slopes, drop inlets, two sedimentation ponds, and a large drainage channel (which comprises the western tributary and includes rock check dams to control flow velocity). All drainage structures appeared to be in relatively good condition, with the exception of the drain grates around the entire landfill cap, which were observed to be partially covered with leaf debris and encroaching ground cover. Additionally, several drain cleanouts about the perimeter of the landfill cap were observed to be missing caps. All of these issues were corrected or repaired by BDC in late 2015.

All monitoring wells and gas probes were accounted for and observed to be in relatively good condition; however, general maintenance issues were associated with a majority of the locations. Almost all monitoring well and gas probe locks were difficult to open or were missing and were subsequently replaced by BDC.

The chain link fence that surrounds the perimeter of the site was inspected and observed to be in good condition, with the exception of an opening in the fence near GP-14. Just inside the fence, two areas of soil erosion were observed extending from the berm of Route 276 to the down-gradient rip-rap drainage channel. Both erosion areas were observed along Route 276, near gas probe GP-14. These issues were reported to BDC and repaired in late 2015.

Orange staining of rocks and stream sediments was observed in the down-gradient drainage channel along Route 276, beginning at the southern end of the rip-rap section next to gas probe GP-12. The staining was observed downstream to a point next to gas probe GP-11. The stream was observed to be normal in appearance (no orange staining) at the point near the water tank entrance and monitoring wells 1-GW-10 and 1-GW-7. The cause of the visible staining is suspected to be from iron leaching from the rock in the rock-lined channel.

A recently rutted section was observed in the area between OBL and the Rubble Landfill. There was no explanation given for the ruts, and they appeared to be outside the OBL boundary.

6.5.2 FTA Site Inspection

The inspection of the FTA site was conducted by observing the former concrete pad and the wooded area to the south, where the two monitoring wells for LTM are located. All other monitoring wells at the FTA site were permanently abandoned in 2005, in accordance with COMAR 26.04.04.11 and are documented in the report titled *Site Repairs at Sites 1 and 2* (Shaw, 2005). The bank along HVB was also inspected for erosion issues.

Most of the structures have been demolished, and the majority of the site was observed to be overgrown with vegetation and heavily wooded. Though not a measure of remedy effectiveness, the concrete pad associated with the former FTA was observed to be severely cracked and becoming inundated with vegetation. The two monitoring wells used for long- term monitoring (i.e., 2-GW-2 and 2-GW-5) were inspected by opening and checking for integrity and security. The wells did not have locks, and the existing well caps were compromised. These have since been repaired by BDC in late 2015. As the FTA remedial action only includes deed restrictions with groundwater monitoring, no other issues were identified during the site inspection.

6.6 Interviews

Interviews were conducted at the site, via e-mail, and over the phone by KGS in January and February 2015. Information generated by the interviews was obtained through a series of questions outlined in the Five-Year Review Guidance document (USEPA, 2001). Interviewees were selected based on their familiarity with the site history and ROD-related issues. Their input regarding the protectiveness of the remedy at the OBL and FTA has been incorporated into this Five-Year Review report. The interview records are included as **Appendix D**.

7.0 Technical Assessment

7.1 Question A: Is the remedy functioning as intended?

7.1.1 OBL

Following a review of all pertinent site information, documents, and monitoring data, it is apparent that ROD Performance Standards for manganese, and to a lesser extent, iron, as set forth in the ROD, continue to be exceeded at monitoring locations nearest to the landfill during the current (i.e., 2010-2015) Five-Year Review period. However, based on monitoring data for downgradient monitoring wells, the COCs do not appear to be migrating beyond the property boundary at concentrations exceeding the ROD Performance Standards (**Figure 3**).

Furthermore, aside from wells 1-GW-3 and 1-GW-8, which continue to exhibit concentrations greater than the ROD Performance Standards, iron and manganese concentrations have generally decreased from 1991 until the present. Monitoring data are presented in **Tables 1** through **3**.

Aside from minor maintenance issues, the ICs in place for the OBL are effective in preventing the use of groundwater for potable consumption and preventing intrusive activities that could impact the integrity of the landfill cap. The groundwater data suggest site contaminants are not migrating offsite. The cap and related infrastructure are in good condition. It appears that the ECs (landfill cap, fences, and signage) are effective in preventing human exposure to the COCs in groundwater (iron and manganese).

7.1.2 FTA

Similar to the OBL, the implementation of ICs at the FTA is functioning as intended by the ROD. There was no evidence during the site inspection that would suggest that groundwater is being used for potable consumption. However, a review of the groundwater monitoring data has indicated that concentrations of both iron and manganese have consistently exceeded the respective ROD Performance Standards during the current Five-Year Review period (2010-2015). Sampling locations are shown on **Figure 5**; concentrations are presented in **Table 6** and **Table 7**. The concentration of iron in monitoring well 2-GW-2 exceeded the performance standard in one of the four sampling events, and three of the four events in the sample collected from 2-GW-5. Manganese was detected above the performance standard in all four samples collected from each well.

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of selection still valid?

The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are still valid for groundwater, as there have been no changes.

Both surface water and sediment were removed from the LTMP on the basis of incomplete exposure pathways and poor habitat for ecological receptors (i.e., rip-rap lined stream channel) (NAVFAC, 2006).

In the *Final Surface Water and Sediment Monitoring Report for IR Site 1 (OBL)* (JMWA, 2005), a limited ecological risk evaluation was performed utilizing the analytical results from the surface water and sediment samples collected from the site in 2005. The results from the 2005 samples were also compared to the results from surface water and sediment samples collected in 1991, 1994, and 1999 to evaluate trends.

The ecological risk evaluation in 2005 was consistent with the approach used in the previous evaluation in 1999 (which also included an evaluation of the 1991 and 1994 data), and included

the calculation of HQs. HQs are calculated by dividing exposure levels (in the form of media-based concentrations or ingested doses) by corresponding toxicological benchmark levels shown in the scientific literature to be protective of ecological receptors. An HQ greater than or equal to 1.0 is indicative of potential ecological risk. It was assumed in the 2005 evaluation that the exposure scenarios and pathways remained the same as the scenarios in 1999, although the toxicity benchmarks were different than in 1999. Based on the 2005 ecological risk evaluation, it was concluded that the magnitude of ecological risk decreased substantially from the early 1990s to 2005. The number of constituents with HQs greater than or equal to 1.0 decreased from 26 in 1991/1994 to 18 in 2005 for sediment and from 15 in 1991/1994 to one in 2005 for surface water. Note that even though some HQs remained above 1.0 throughout from 1991 through 2005, the magnitude of the HQs generally decreased from the 1991/1994 levels.

Based on the 2005 ecological risk evaluation, it was determined that the collection of surface water and sediment samples could be discontinued, and this sampling was not included in the 2006 *Long-Term Monitoring Plan Update* (NAVFAC, 2006). An additional reason cited for discontinuing the surface water and sediment monitoring was that both tributaries surrounding OBL offer only a limited habitat for ecological receptors. For example, the western tributary which borders OBL is a mostly dry, rock-lined channel with little to no surface water or sediment present, offers a very poor habitat for ecological receptors, and is comparable to an incomplete exposure pathway. Furthermore, the eastern tributary can be characterized as an intermittent stream with limited areas of surface water and sediment and also offers a poor habitat for ecological receptors. The quality of the habitat has not improved in the tributaries since 2005, and the conclusion that the collection of surface water and sediment samples could be discontinued remains valid.

The ecological screening criteria used in the 2005 ecological risk evaluation were compared to current USEPA Region III Biological Technical Assistance Group (BTAG) screening values (USEPA, 2006) to determine whether any updates to the criteria would have changed the conclusion for discontinuing surface water and sediment sampling. None of the ecological screening criteria used to evaluate sediment data have been updated. Only one parameter detected in surface water from 2005 has a screening value which was updated in the interim time. The ecological screening criterion for mercury in surface water has been updated from 1 µg/L to a lower value of 0.026 µg/L. However, mercury was not detected in any of the surface water samples collected in 2005. The positive result for mercury reported in one sample was considered to be an artifact of blank contamination; and therefore, mercury was not considered to be present in any surface water samples. The updated mercury criterion for surface water screening does not change the conclusions of the ecological risk evaluation.

7.2.1 Changes in Standards and Details To Be Considered (TBC)

Landfill gas monitoring is being performed at the OBL to ensure that the concentration of methane gas associated with the landfill remains in compliance with COMAR 26.04.07.03B (9). Since there are no structures within the vicinity of the landfill, the 25% LEL for methane screening level for nearby structures is not applicable. However, 100% LEL for methane has been exceeded at locations between the landfill boundary and the property boundary, specifically at GP-12 throughout 2015. Methane monitoring data, which have been collected since July 2007 from OBL landfill gas vents and gas probes, are presented in **Table 4** and **Table 5**, respectively. Monitoring locations are shown on **Figure 4**.

7.2.2 Changes in Land Use

There has not been any change in land use for the OBL or the FTA since the last Five-Year

Review. The Town of Port Deposit continues to designate the entire BDC parcel (approximately 1,200 acres) with its own designation (BX mixed use designation). The updated zoning map is included in Appendix E.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information beyond that which is presented in this report has been identified that could call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

7.4.1 OBL Summary

The RAOs are being achieved through the implementation of both ICs and ECs. The remedy specified by the ROD, and as modified by the ESD, continues to be protective of human health and the environment.

ICs prevent unacceptable exposure to groundwater use and landfill wastes at the OBL. The results of the long-term monitoring demonstrate that the groundwater concentrations continue at concentrations above the ROD Performance Standards for iron and manganese.

In addition to groundwater monitoring, methane monitoring is also required by MDE. Landfill gas monitoring was initiated in July 2007 to evaluate compliance with COMAR 26.04.07.03B (9). BDC currently collects methane samples. The Navy has completed a monthly methane investigation at the site and plans to install a methane mitigation system in 2016. The system includes a methane interception trench with flares for venting.

Requirements for surface water and sediment monitoring have been removed from the LTMP based on evaluation of surface water and sediment data collected in 2005.

7.4.2 FTA Summary

The RAOs are being achieved through the implementation of ICs and ECs. The remedy specified by the ROD, and as modified by the ESD, continues to be protective of human health and the environment.

ICs prevent unacceptable exposure to groundwater at the FTA. The results of the long-term monitoring demonstrate that the groundwater concentrations continue at concentrations above the ROD Performance Standards for iron and manganese. Long-term monitoring documents indicate progress toward achieving the ROD Performance Standards.

8.0 Issues

The issues below were identified for the OBL and FTA, following a site inspection, a documentation review, interviews with relevant parties, and an evaluation of available long- term monitoring data.

8.1 OBL Issues

8.1.1 Performance-Based Issues

- None identified.

8.1.2 General Maintenance Issues

- None identified.

8.2 FTA Issues

8.2.1 Performance-Based Issues

- None identified.

8.2.2 General Maintenance Issues

- None identified.

9.0 Recommendations and Follow-up Actions

9.1 OBL Recommendations

The Navy and the current property owner (BDC) should address the recommendations and ensure the protectiveness of the remedy at the OBL in accordance with the existing legal agreements with respect to the responsibilities of each party.

9.1.1 Performance-Based Recommendations

- Continue groundwater monitoring and enforcement of ICs until the ROD Performance Standards have been achieved.
- Continue landfill gas monitoring to ensure compliance with COMAR 26.04.07.03B (9).

9.1.2 General Maintenance Recommendations

- Abandon all monitoring wells no longer in use per MDE regulations via a licensed Maryland well driller (includes 1-GW-1, 1-GW-2, 1-GW-4, 1-GW-6, 1-GW-7, and 1-GW-10.)

9.1.3 Additional OBL Recommendations

- Continue groundwater monitoring in accordance with the latest LTMP Update (i.e., frequency of every 15 months). Frequency could be altered based on additional data which will be evaluated as part of the next Five-Year Review Report.
- Continue to maintain ICs by preventing consumption of groundwater.
- Continue to maintain ECs, including gates, fences, signs, and a landfill cap.

9.2 FTA Recommendations

The Navy and the current property owner (BDC) should address the recommendations and ensure the protectiveness of the remedy at the FTA in accordance with the existing legal agreements with respect to the responsibilities of each party.

9.2.1 Performance-Based Recommendations

- Groundwater monitoring and enforcement of ICs should continue until the ROD Performance Standards specified in the ROD have been achieved.

9.2.2 General Maintenance Recommendations

- None.

9.2.3 Additional FTA Recommendations

- Continue groundwater monitoring in accordance with the latest LTMP Update (i.e., frequency of every 15 months).
- Continue to maintain ICs by preventing consumption of groundwater.

10.0 Protectiveness Statement

The remedy for the OBL is considered to be short-term protective of human health and the environment as defined in the *Memorandum Clarifying the Use of Protectiveness Determinations for Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Reviews* (USEPA, 2012). ICs, specifically groundwater use restrictions, have been effective in preventing exposure to groundwater contaminants identified in the ROD for the OBL. The OBL cap and additional ECs, such as fences, gates, and signage, are effective in containing wastes and preventing exposure to humans and the environment.

Aside from the exceptions noted previously, the long-term groundwater monitoring data have documented an overall decrease in chlorobenzene, iron, and manganese concentrations since 1991. The performance standard for chlorobenzene has been achieved. The ROD Performance Standards for iron and manganese have been achieved in monitoring wells downgradient of the landfill, and demonstrate these standards are being met at the property boundary. Although the ROD Performance Standards for iron and manganese are not being met in some of the monitoring wells closest to the landfill, restrictions on groundwater use prevent exposure, thereby eliminating potential unacceptable risks to human health.

The remedy for the FTA continues to be protective of human health and the environment. ICs, specifically groundwater use restrictions, have been effective in preventing exposure to groundwater contaminants identified in the ROD. The results of the long-term monitoring demonstrate that the groundwater concentrations continue at concentrations above the ROD Performance Standards for iron and manganese.

11.0 Next Review

Completion of the next Five-Year Review for former Naval Training Center-Bainbridge is required by August 2020.

12.0 References

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TABLES

TABLE 1
Groundwater Analytical Results for Chlorobenzene (ug/L)
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Performance Standard 100 ug/L

Well ID	Max 1991	Max 1994	April 1999	April 2002	October 2002	April 2003	October 2003	May 2004	October 2004	July 2005	July 2006	December 2006	July 2007	May 2008	November 2008	June 2009	December 2009	June 2010
1-GW-3	**330**	**370**	**170**	23	26	**120**	**150**	79	67	77	47	81	31	64	3	46	100	67
1-GW-5	**160**	**160**	38	3 U	3 J	10 U	10 U	2 J	10 U	4	ND	2	ND	ND	ND	ND	2	ND
1-GW-6	**170**	10 U	1	35	10 U	10 U	3 J	10 U	10 U	ND	ND	ND	ND	ND	1	ND	ND	ND
1-GW-7	1 J	10 U	1 U	10 U	10 U	10 U	10 U	10 U	10 U	ND	ND	ND	--	ND	ND	ND	ND	ND
1-GW-8	**160**	**220**	87	25	59	6 J	29	38	35	4	11	ND	23	14	7	6	ND	3
1-GW-9	**160**	93	24	9 J	19	10 U	50	43	5 J	23	ND	ND	14	3	ND	4	ND	15
1-GW-10	--	10 U	1 U	10 U	10 U	10 U	10 U	10 U	10 U	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-GW-11	--	10 U	1 U	10 U	10 U	10 U	--	10 U	10 U	ND	ND	ND	ND	ND	ND	ND	ND	ND

ug/L microgram per liter
U analyte was not detected at or above the reporting limit
B Result is between the method detection limit and reporting limit
-- Sample not taken
ND Not detected at or above the laboratory detection limit.
** Four Sampling rounds were conducted in 1991 an six in 1994. The max. concentrations for each year are presented.
Shading indicates Performance Standard is exceeded.

TABLE 2
Groundwater Analytical Results for Iron (ug/L)
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Performance Standard 4600 ug/L

Well ID	Max 1991	Max 1994	April 1999	April 2002	October 2002	April 2003	October 2003	May 2004	October 2004	July 2005	July 2006
1-GW-3	**58800**	**37500**	**32600**	11 B	**5620**	**12100**	**22700**	**30200**	**14800**	**23000**	**17000**
1-GW-5	3320	**11900**	2320	27	36 B	26 U	12 U	**16600**	264	**7700**	400
1-GW-6	1950	**13200**	170 B	178	33 B	26 U	337	217	42 B	ND	310
1-GW-7	1890	2850	16 B	13 B	15 B	26 U	12 U	**15800**	45 B	510	ND
1-GW-8	**39400**	**15200**	**10900**	54 B	**6640**	26 U	**7920**	**19400**	**8020**	**15000**	3400
1-GW-9	**13000**	**15700**	55 B	10 B	1190	26 U	**6360**	**13200**	39	**5800**	170
1-GW-10	--	589	24 B	100 U	15 U	26 U	12 U	137	42 B	110	ND
1-GW-11	--	**6510**	150 B	13 B	15 U	26 U	--	384	103	ND	260
1-GW-13	--	--	--	--	--	--	--	--	--	--	--

Well ID	December 2006	July 2007	May 2008	November 2008	June 2009	December 2009	June 2010	September 2011	December 2012	March 2014
1-GW-3	**17000**	**18000**	**20000**	**8200**	**21000**	**31000**	**29000**	**39000**	**13000**	**31000**
1-GW-5	ND	1800	ND	ND	ND	ND	170	180	ND	ND
1-GW-6	280	220	ND	220	ND	ND	350	--	--	--
1-GW-7	ND	--	ND	ND	ND	ND	ND	--	--	--
1-GW-8	810	**13000**	2700	1500	**6200**	ND	**14000**	**4700**	**11000**	**9300**
1-GW-9	ND	760	400	ND	ND	ND	560	ND	ND	ND
1-GW-10	ND	ND	ND	ND	ND	ND	ND	--	--	--
1-GW-11	130	ND	ND	ND	ND	ND	ND	--	--	--
1-GW-13	--	--	--	--	--	--	--	ND	ND	ND

ug/L microgram per liter
U analyte was not detected at or above the reporting limit
B Result is between the method detection limit and reporting limit
-- Sample not taken
ND Not detected at or above the laboratory detection limit.
Shading indicates Performance Standard is exceeded.

TABLE 3
Groundwater Analytical Results for Manganese (ug/L)
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Performance Standard 300 ug/L

Well ID	Max 1991	Max 1994	April 1999	April 2002	October 2002	April 2003	October 2003	May 2004	October 2004	July 2005	July 2006
1-GW-3	**7550**	**7540**	**5470**	**5070**	**4760**	**5600**	**5510**	**4930**	**4950**	**5200**	**4600**
1-GW-5	**4140**	**3990**	**3120**	**1930**	**1740**	**1550**	**1400**	**1630**	**991**	**1400**	**1000**
1-GW-6	**4070**	**399**	223	**704**	155	1 B	**379**	15 B	57	170	28
1-GW-7	**320**	103	1 B	1 B	3	1 B	2 B	169	1 B	ND	ND
1-GW-8	**7870**	**6580**	**5080**	**3830**	**4380**	**1790**	**3710**	**6230**	**4770**	**5300**	**3400**
1-GW-9	**6700**	**4480**	**1730**	**1140**	**2440**	26 U	**6370**	**5100**	**2110**	**3600**	**540**
1-GW-10	--	61	1 B	1 B	1 U	3 B	5 B	6 B	2 B	ND	ND
1-GW-11	--	109	9	0 B	1 U	1 B	--	15 B	1 B	ND	ND
1-GW-13	--	--	--	--	--	--	--	--	--	--	--

Well ID	December 2006	July 2007	May 2008	November 2008	June 2009	December 2009	June 2010	September 2011	December 2012	March 2014
1-GW-3	**4900**	**4500**	**4300**	**3900**	**4200**	**5000**	**4200**	**4500**	**4100**	**3300**
1-GW-5	**360**	**5800**	**310**	**950**	**410**	**940**	160	**1700**	120	160
1-GW-6	29	120	ND	240	23	ND	130	--	--	--
1-GW-7	ND	--	ND	ND	ND	ND	3	--	--	--
1-GW-8	**2400**	**4900**	**3200**	**3700**	**3700**	**2200**	**5100**	**3900**	**4400**	**3700**
1-GW-9	11	**4700**	**860**	**340**	**810**	260	**4500**	4	ND	ND
1-GW-10	ND	ND	ND	ND	ND	ND	26	--	--	--
1-GW-11	ND	ND	ND	ND	ND	ND	5	--	--	--
1-GW-13	--	--	--	--	--	--	--	5	3	ND

ug/L microgram per liter
U analyte was not detected at or above the reporting limit
B Result is between the method detection limit and reporting limit
-- Sample not taken
ND Not detected at or above the laboratory detection limit.
Shading indicates Performance Standard is exceeded.

TABLE 4
Soil Gas Measurements - Methane Monitoring
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Vent ID	Jul 2007 %LEL	Dec 2007 %LEL	May 2008 %LEL	Sep 2008 %LEL	Jun 2009 %LEL
G-3	7	12	5	9	0
G-6	1	0	6	11	0
G-7	80	100	100	100	9
G-8	97	100	100	100	100
G-12	12	100	100	100	100
G-15	100	100	100	100	100
G-17	1	100	6	17	0
G-18	6	0	8	23	0
G-19	7	9	8	0	1
G-20	100	100	100	100	100
G-21	100	100	100	100	100
G-23	8	100	100	100	100
G-24	100	100	72	100	100
G-25	100	100	9	65	100
G-26	7	65	100	10	0
G-27	36	100	100	100	100
G-28	83	100	72	100	100
G-29	100	100	14	100	0
G-30	11	23	11	8	0
G-31	11	100	80	100	5
G-32	10	100	100	100	100
G-33	100	100	44	100	47
G-34	1	75	6	4	0
G-35	4	100	95	100	9
G-36	100	100	100	100	34
G-37	3	10	6	0	0
G-38	1	0	7	0	0
G-39	99	0	0	0	0
G-40	100	100	100	5	0
G-41	1	100	5	1	0
G-42	1	16	4	0	0
G-44	3	14	7	17	0
G-45	1	15	7	13	0

TABLE 5
Soil Gas Measurement - Methane Monitoring
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Monitoring Probe	December 2007	May 2008	September 2008	June 2009	December 2009	January 2010	June 2010	December 2010	June 2011	September 2011	December 2011	March 2012	June 2012
GP-1	0	0	1	0	0	0	0	0	0	0	0	0	0
GP-2	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-3	0	0	0	0	0	2	0	0	0	0	0	0	0
GP-4	0	0.05	0	0	0	5	0	0	0	0	0	0	0
GP-5	28	0.05	0.05	0	0	5	2	0	0	0	0	0	0
GP-6	100	100	100	NS	NS	100	100	100	100	100	100	100	100
GP-7	100	100	17	NS	NS	100	100	100	100	100	100	100	100
GP-8	100	100	26	0	0	0	0	100	0	0	0	0	0
GP-9	0	0	5	0	0	0	0	0	0	0	0	0	0
GP-10	0	0	2	0	0	0	0	0	0	0	0	0	0
GP-11	1	NS	3	0	0	0	0	0	0	0	0	0	0
GP-12	0	0	17	0	100	100	76	100	100	14	8	38	54
GP-13	0	0	6	0	0	0	2	0	0	0	0	0	0
GP-14	0	0	18	0	0	0	0	0	0	0	0	0	0
GP-15	0	0	9	0	0	0	0	0	0	0	0	0	0
GP-16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-17	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-18	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-19	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-20	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-21	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-22	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-23	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-24	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-25	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GP-26	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:
Units in % Lower Explosive Limit (LEL) CH_4, percentage of lower explosive limit for methane
NS - Not Sampled
*Dec 2013, March & July 2014 GP-12 - Water intruded into GEM2000 after few mintues.
** Data collected by AGVIQ on May 8, 2014
*** Data collected by BDC on October12, 2015, and March 9, 2016

TABLE 5
Soil Gas Measurement - Methane Monitoring
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Monitoring Probe	September 2012	December 2012	March 2013	June 2013	September 2013	December 2013	March 2014	May 2014 **	July 2014	September 2014	December 2014	January 2015[1]	February 2015[1]
GP-1	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-2	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-3	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-4	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-5	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-6	100	100	100	100	100	100	100	21	100	100	100	176	64
GP-7	100	100	100	100	100	100	100	100	100	100	100	352	206
GP-8	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-9	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-10	NS	0	0	0	0	0	0	0	0	0	0	0	0
GP-11	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-12	100	10	14	26	1	62*	24*	0	58*	56*	11	14	6
GP-13	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-14	0	0	0	0	0	0	0	ND	0	0	0	0	0
GP-15	0	0	0	0	0	0	0	0	0	0	0	0	0
GP-16	NS	NS	NS	NS	NS	NS	NS	2	0	100	10	134	5.4
GP-17	NS	NS	NS	NS	NS	NS	NS	100	0	100	100	348	32
GP-18	NS	NS	NS	NS	NS	NS	NS	100	0	100	100	328	160
GP-19	NS	NS	NS	NS	NS	NS	NS	100	0	100	100	358	132
GP-20	NS	NS	NS	NS	NS	NS	NS	0	0	0	0	0	0
GP-21	NS	NS	NS	NS	NS	NS	NS	4	0	0	0	0	0
GP-22	NS	NS	NS	NS	NS	NS	NS	4	0	0	80	18	26
GP-23	NS	NS	NS	NS	NS	NS	NS	0	0	0	0	0	0
GP-24	NS	NS	NS	NS	NS	NS	NS	0	0	0	0	0	0
GP-25	NS	NS	NS	NS	NS	NS	NS	0	0	0	0	0	0
GP-26	NS	NS	NS	NS	NS	NS	NS	0	0	0	0	0	0

Notes:
Units in % Lower Explosive Limit (LEL) CH_4, percentage of lower explosive limit for methane
NS - Not Sampled
*Dec 2013, March & July 2014 GP-12 - Water intruded into GEM2000 after few mintues.
** Data collected by AGVIQ on May 8, 2014
*** Data collected by BDC on October12, 2015, and March 9, 2016
1 = % LEL Methane values were calculated based on % Methane readings.

TABLE 5
Soil Gas Measurement - Methane Monitoring
Old Base Landfill
FNTC-Bainbridge
Port Deposit, Maryland

Monitoring Probe	March 2015[1]	April 2015[1]	May 2015[1]	June 2015[1]	July 2015[1]	August 2015[1]	September 2015[1]	October 2015[1]	October 2015***	November 2015[1]	December 2015[1]	March 2016***
GP-1	0	0	0	0	0	0	0	0	0	0	0	0
GP-2	0	0	0	0	0	0	0	0	0	0	0	0
GP-3	0	0	0	0	0	0	0	0	0	0	0	0
GP-4	0	0	0	0	0	0	0	0	0	0	0	0
GP-5	0	0	0	0	0	0	0	0	0	0	0	0
GP-6	0	4	10	10	162	158	106	60	100	200	10	0
GP-7	216	264	358	444	638	738	624	538	100	440	378	100
GP-8	0	0	0	0	0	0	0	0	0	0	0	0
GP-9	0	0	0	0	0	0	0	0	0	0	0	0
GP-10	0	0	0	0	0	0	0	0	0	0	0	0
GP-11	0	0	0	0	0	0	0	0	0	0	0	0
GP-12	0	26	12	4	12	134	60	106	10	80	104	9
GP-13	0	0	0	0	0	0	0	0	0	0	0	0
GP-14	0	0	0	0	0	0	0	0	0	0	0	0
GP-15	0	0	0	0	0	0	0	0	0	0	0	0
GP-16	28	20	36	42	76	128	44	20	100	110	160	0
GP-17	226	2	140	0	154	450	194	168	100	198	270	70
GP-18	252	0	124	0	422	684	402	366	100	266	432	60
GP-19	14	2	30	0	0	92	0	106	0	0	0	0
GP-20	0	0	0	0	0	0	0	0	0	0	0	0
GP-21	0	0	0	0	0	0	0	0	0	NC	0	0
GP-22	6	0	0	0	0	0	0	0	9	0	0	0
GP-23	0	0	0	0	0	0	0	0	0	0	0	0
GP-24	0	0	0	0	0	0	0	0	0	0	0	0
GP-25	0	0	0	0	0	0	0	0	0	0	0	0
GP-26	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
Units in % Lower Explosive Limit (LEL) CH_4, percentage of lower explosive limit for methane
NS - Not Sampled
*Dec 2013, March & July 2014 GP-12 - Water intruded into GEM2000 after few mintues.
** Data collected by AGVIQ on May 8, 2014
*** Data collected by BDC on October12, 2015, and March 9, 2016
1 = % LEL Methane values were calculated based on % Methane readings.

TABLE 6
Groundwater Analytical Results for Iron (ug/L)
Fire Training Area
FNTC-Bainbridge
Port Deposit, Maryland

Performance Standard 4600 ug/L

Well ID	Max 1991	Max 1994	April 1999	April 2002	October 2002	April 2003	October 2003	May 2004	October 2004	July 2005	July 2006
2-GW-2	**20900**	**33600**	3430	10 B	15 U	26 U	12 U	76 B	24	ND	--
2-GW-5	**17700**	**79300**	**39400**	100 U	**4860**	**18700**	**10200**	**33700**	192	**7700**	**4800**

Well ID	December 2006	July 2007	May 2008	November 2008	June 2009	December 2009	June 2010	September 2011	December 2012	March 2014
2-GW-2	170	**7900**	1600	ND	270	ND	**12000**	110	1600	1200
2-GW-5	1200	850	**13000**	1500	**10000**	**14000**	200	**23000**	**13000**	**19000**

ug/L microgram per liter
U analyte was not detected at or above the reporting limit
B Result is between the method detection limit and reporting limit
-- Sample not taken
ND Not detected at or above the laboratory detection limit.
Shading indicates Performance Standard is exceeded.

TABLE 7
Groundwater Analytical Results for Manganese (ug/L)
Fire Training Area
FNTC-Bainbridge
Port Deposit, Maryland

Performance Standard 300 ug/L

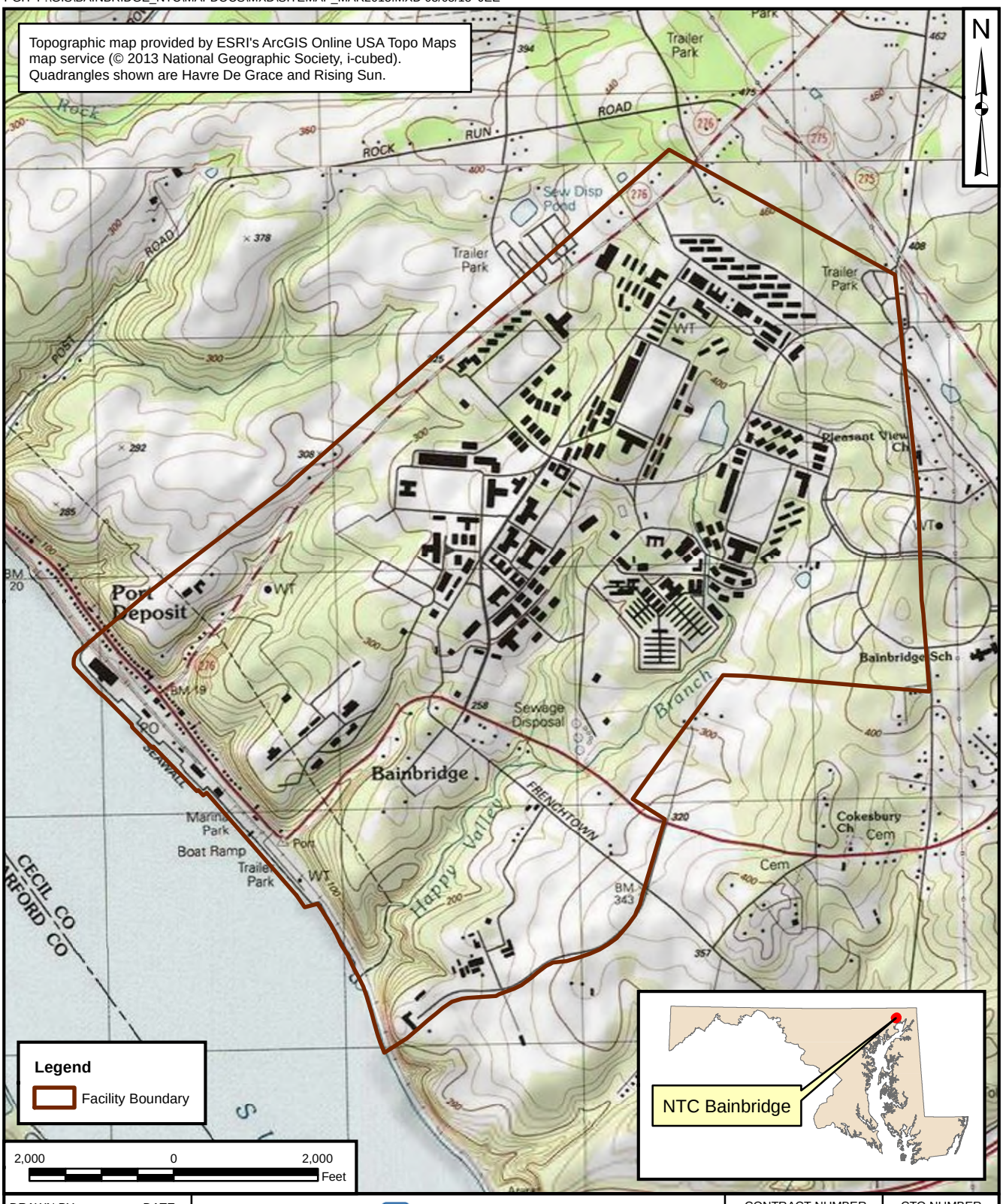
Well ID	Max 1991	Max 1994	April 1999	April 2002	October 2002	April 2003	October 2003	May 2004	October 2004	July 2005	July 2006
2-GW-2	**1440**	**3970**	162 J	1 B	1 B	1 B	4 B	3 B	8 B	ND	--
2-GW-5	**3090**	**5290**	**3870**	**1910**	**890**	**4890**	**1850**	**2100**	**538**	**870**	**4500**

Well ID	December 2006	July 2007	May 2008	November 2008	June 2009	December 2009	June 2010	September 2011	December 2012	March 2014
2-GW-2	37	**3700**	140	**550**	**2100**	190	**3400**	**4000**	**500**	**590**
2-GW-5	38	110	**1400**	**660**	**1100**	**2400**	**320**	**2600**	**2100**	**2800**

ug/L microgram per liter
U analyte was not detected at or above the reporting limit
B Result is between the method detection limit and reporting limit
-- Sample not taken
ND Not detected at or above the laboratory detection limit.
Shading indicates Performance Standard is exceeded.

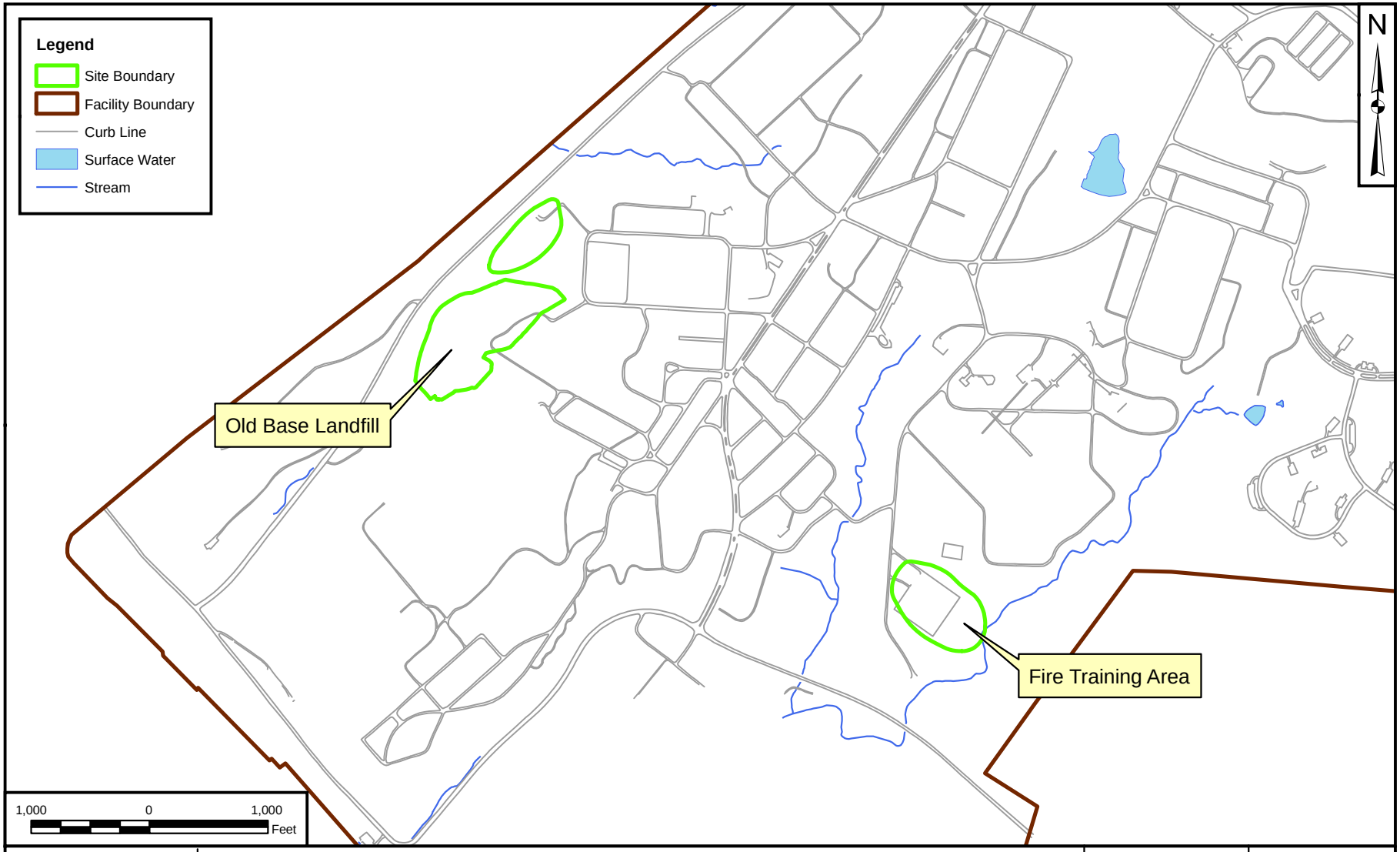
FIGURES

PGH P:\GIS\BAINBRIDGE_NTC\MAPDOCS\MXD\SITEMAP_MAR2015.MXD 03/05/15 JEE



DRAWN BY: J. ENGLISH — DATE: 03/05/15	TETRA TECH	CONTRACT NUMBER: 7452	CTO NUMBER: 007
CHECKED BY: A. McGIVNEY — DATE: 03/05/15	FACILITY LOCATION MAP FORMER NAVAL TRAINING CENTER BAINBRIDGE PORT DEPOSIT, MARYLAND	APPROVED BY: ___ — DATE: ___	
REVISED BY: ___ — DATE: ___		APPROVED BY: ___ — DATE: ___	
SCALE: AS NOTED		FIGURE NO.: 1	REV: 0

PGH P:\GIS\BAINBRIDGE_NTC\MAPDOCS\MXD\ENV_SITES_MAR2015.MXD 03/30/15 JEE



DRAWN BY: J. ENGLISH	DATE: 03/05/15	TETRA TECH	CONTRACT NUMBER: 7452 / CTO NUMBER: 007
CHECKED BY: A. McGIVNEY	DATE: 03/30/15	OLD BASE LANDFILL AND FIRE TRAINING AREA LOCATIONS FORMER NAVAL TRAINING CENTER BAINBRIDGE PORT DEPOSIT, MARYLAND	APPROVED BY: — / DATE: —
REVISED BY: —	DATE: —		APPROVED BY: — / DATE: —
SCALE: AS NOTED			FIGURE NO.: 2 / REV: 0

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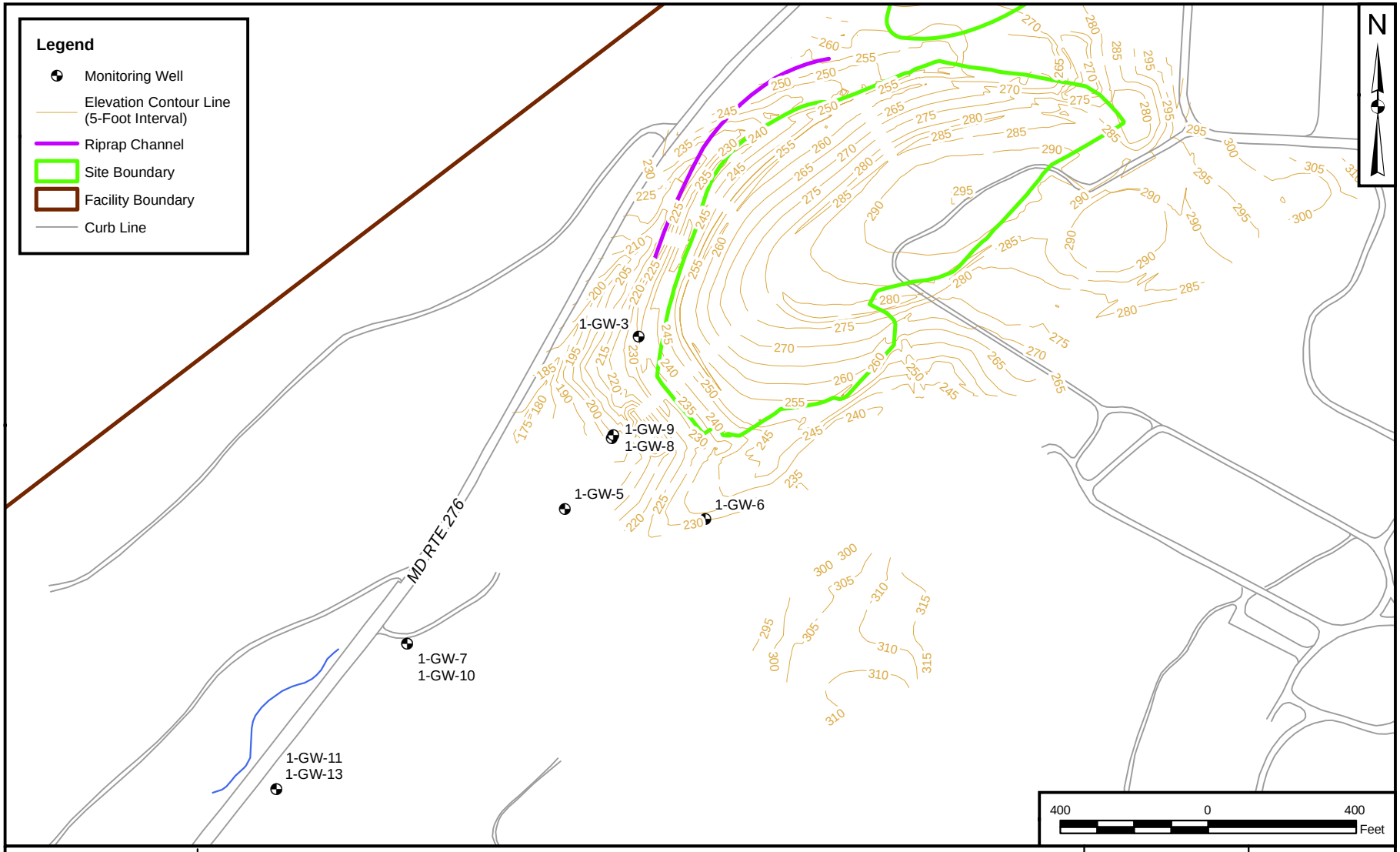
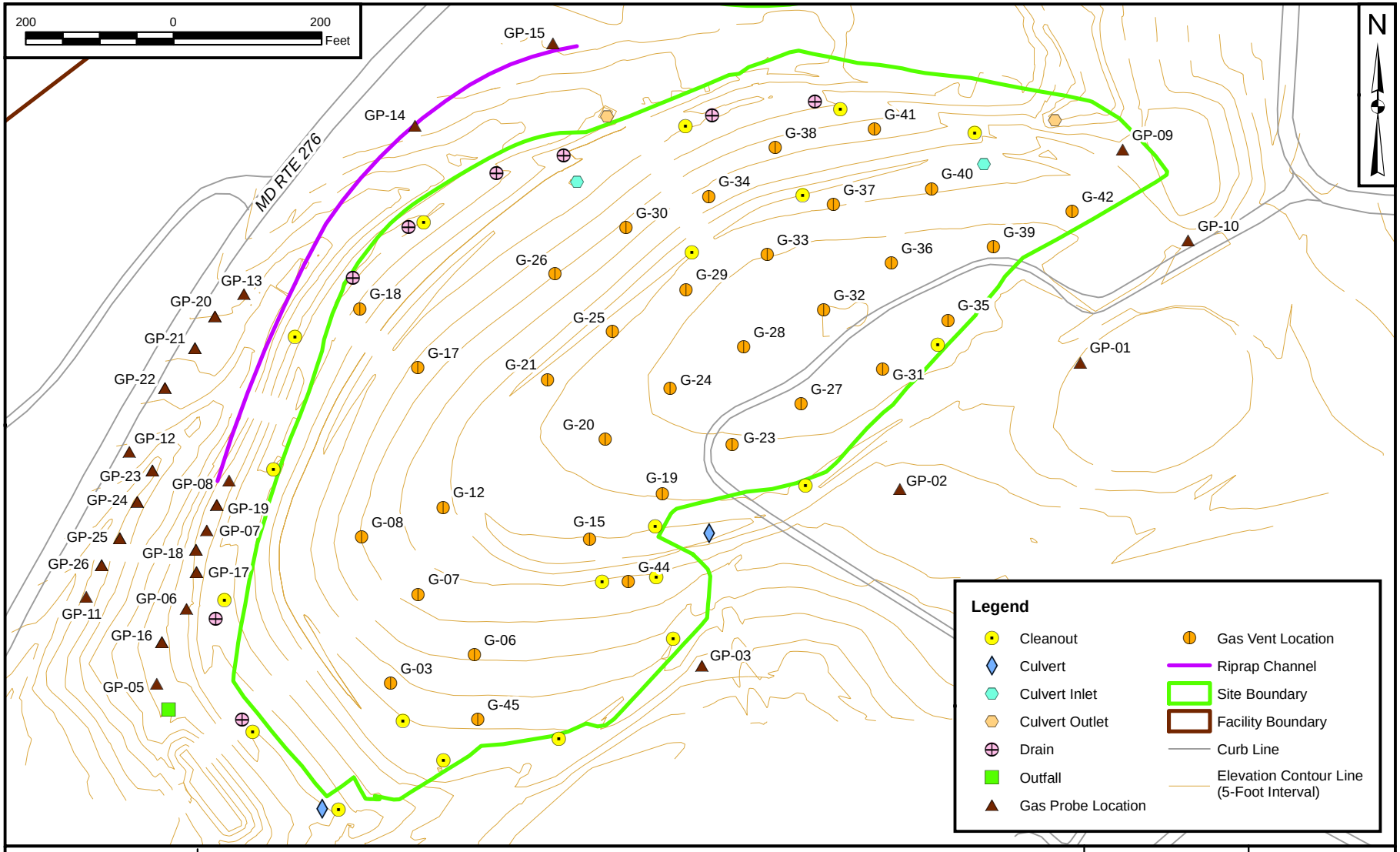


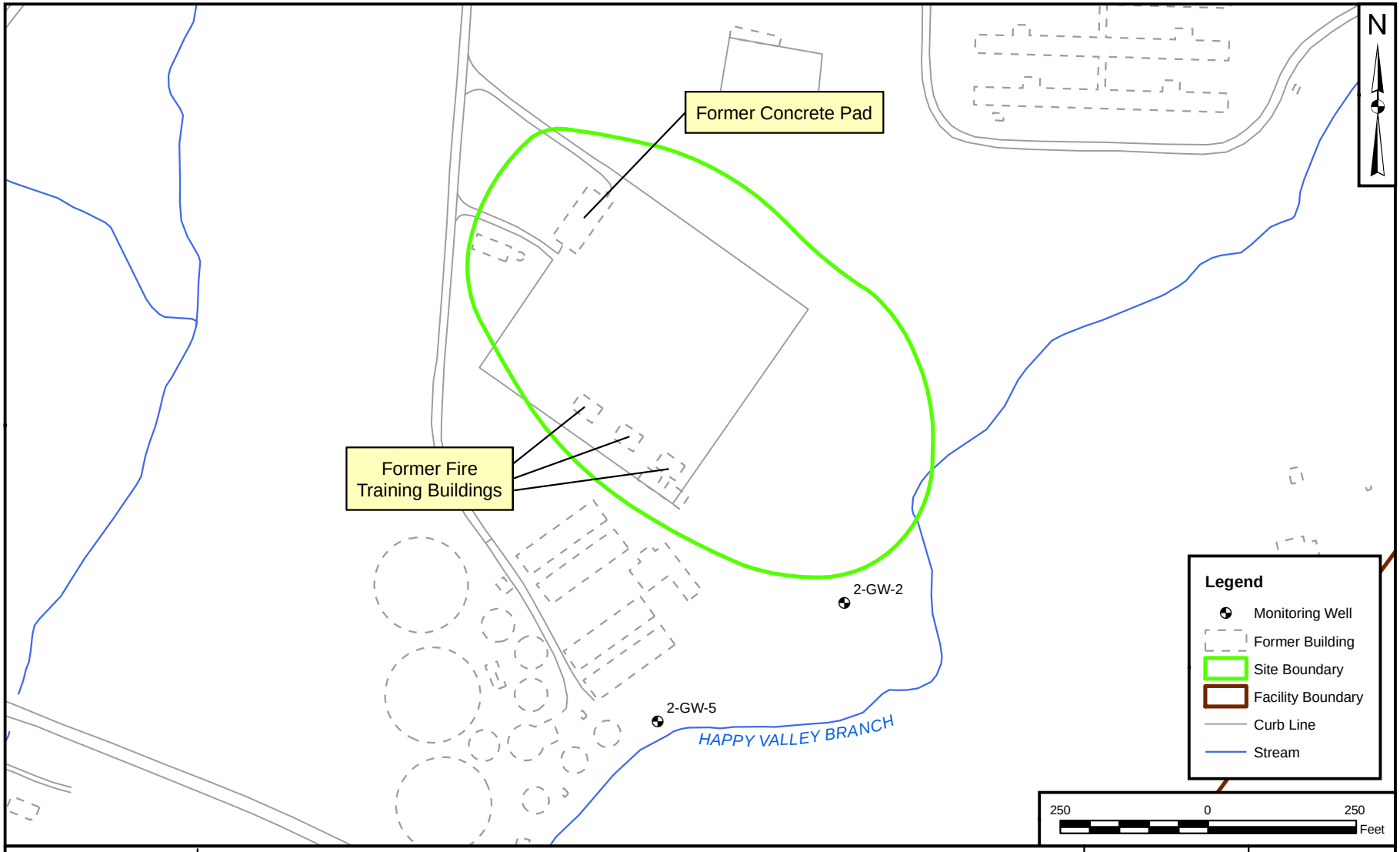
DRAWN BY: J. ENGLISH	DATE: 03/05/15	TETRA TECH	CONTRACT NUMBER: 7452 / CTO NUMBER: 007
CHECKED BY: A. McGIVNEY	DATE: 03/30/15	OLD BASE LANDFILL LONG TERM MONITORING WELLS FORMER NAVAL TRAINING CENTER BAINBRIDGE PORT DEPOSIT, MARYLAND	APPROVED BY: — / DATE: —
REVISED BY: —	DATE: —		APPROVED BY: — / DATE: —
SCALE: AS NOTED			FIGURE NO.: 3 / REV: 0

PGH P:\GIS\BAINBRIDGE_NTC\MAPDOCS\MXD\LANDFILL_FEATURES.MXD 03/30/15 JEE



DRAWN BY: J. ENGLISH	DATE: 03/12/15	TETRA TECH	CONTRACT NUMBER: 7452 / CTO NUMBER: 007
CHECKED BY: A. McGIVNEY	DATE: 03/30/15	OLD BASE LANDFILL SITE FEATURES FORMER NAVAL TRAINING CENTER BAINBRIDGE PORT DEPOSIT, MARYLAND	APPROVED BY: — / DATE: —
REVISED BY: —	DATE: —		APPROVED BY: — / DATE: —
SCALE: AS NOTED			FIGURE NO.: 4 / REV: 0

PGH P:\GIS\BAINBRIDGE_NTC\MAPDOCS\MXD\FIRE_TRAINING_LTM_SAMPLOCS.MXD 03/30/15 JEE



DRAWN BY: J. ENGLISH	DATE: 03/05/15	TETRA TECH	CONTRACT NUMBER: 7452 / CTO NUMBER: 007
CHECKED BY: A. McGIVNEY	DATE: 03/30/15	FIRE TRAINING AREA LONG TERM MONITORING WELLS FORMER NAVAL TRAINING CENTER BAINBRIDGE PORT DEPOSIT, MARYLAND	APPROVED BY: — / DATE: —
REVISED BY: —	DATE: —		APPROVED BY: — / DATE: —
SCALE: AS NOTED			FIGURE NO.: 5 / REV: 0

APPENDIX A

SITE INSPECTION CHECKLISTS

OBL

OSWER No. 9355.7-03B-P

Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

I. Site Information
II. Interviews
III. On-site Documents & Records Verified
IV. O&M Costs
V. Access and Institutional Controls
VI. General Site Conditions
VII. Landfill Covers
VIII. Vertical Barrier Walls
IX. Groundwater/Surface Water Remedies
X. Other Remedies
XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: OLD BASE LANDFILL (OBL)	**Date of inspection:** 15 JANUARY 2015
Location and Region: PORT DEPOSIT, MD REGION 3	**EPA ID:** MDD 985397256
Agency, office, or company leading the five-year review: DEPT OF NAVY / H+S ENVIRONMENTAL	**Weather/temperature:** CLEAR TO P. CLOUDY, CALM, 30's

Remedy Includes: (Check all that apply)

- Landfill cover/containment
- Access controls
- Institutional controls
- Groundwater pump and treatment
- Surface water collection and treatment
- Monitored natural attenuation
- Groundwater containment
- Vertical barrier walls
- Other _____

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

4. **Other interviews** (optional) Report attached.

TONI LOZZI, ADMINSTAATIVE AND PROJECTS COORDINATOR, BAINBRIDGE DEVELOPMENT CORPORATION WAS INTERVIEWED ON SITE, 15 JANUARY 2015. SEE APPENDIX FOR DETAILS.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual ✓ — Readily available — Up to date — N/A
   - As-built drawings ✓ — Readily available — Up to date — N/A
   - Maintenance logs — Readily available — Up to date — N/A

   Remarks

2. **Site-Specific Health and Safety Plan** — Readily available — Up to date — N/A
   - Contingency plan/emergency response plan — Readily available — Up to date — N/A

   Remarks

3. **O&M and OSHA Training Records** — Readily available — Up to date — N/A

   Remarks

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available — Up to date — N/A
   - Effluent discharge — Readily available — Up to date — N/A
   - Waste disposal, POTW — Readily available — Up to date — N/A
   - Other permits _____ — Readily available — Up to date — N/A

   Remarks

5. **Gas Generation Records** — Readily available — Up to date — N/A

   Remarks

6. **Settlement Monument Records** — Readily available — Up to date — N/A

   Remarks

7. **Groundwater Monitoring Records** — Readily available — Up to date — N/A

   Remarks LONG TERM MONITORING DATA PROVIDED FROM THROUGH .

8. **Leachate Extraction Records** — Readily available — Up to date — N/A

   Remarks

9. **Discharge Compliance Records**
   - Air — Readily available — Up to date — N/A
   - Water (effluent) — Readily available — Up to date — N/A

   Remarks

10. **Daily Access/Security Logs** — Readily available — Up to date — N/A

    Remarks

IV. O&M COSTS

1. **O&M Organization**
   State in-house — Contractor for State
   PRP in-house — Contractor for PRP
   Federal Facility in-house — Contractor for Federal Facility
   Other _____

2. **O&M Cost Records** ✓ RECORDS NOT AVAILABLE.
   Readily available — Up to date
   Funding mechanism/agreement in place
   Original O&M cost estimate _____ Breakdown attached

   Total annual cost by year for review period if available

   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS — Applicable ✓ N/A

A. Fencing

1. **Fencing damaged** — Location shown on site map — Gates secured ✓ — N/A
   Remarks FENCE ALONG HIGHWAY 276 HAD SEVERAL HOLES PRESENT.

B. Other Access Restrictions

1. **Signs and other security measures** — Location shown on site map — N/A
   Remarks OVERALL SIGNS WERE ADEQUATE. SEVERAL SIGNS NEAR HIGHWAY 276 WERE KNOCKED DOWN OR LOOSE ON MOUNT.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes — No ✓ — N/A
Site conditions imply ICs not being fully enforced — Yes — No ✓ — N/A

Type of monitoring (*e.g.*, self-reporting, drive by) SELF-REPORTING
Frequency 15-MONTHS
Responsible party/agency DEPT OF NAVY
Contact JOE RAIL (Name) — RPM (Title) — (Date) — (Phone no.)

Reporting is up-to-date — Yes ✓ — No — N/A
Reports are verified by the lead agency — Yes ✓ — No — N/A

Specific requirements in deed or decision documents have been met — Yes ✓ — No — N/A
Violations have been reported — Yes — No ✓ — N/A
Other problems or suggestions: Report attached

2. **Adequacy** — ICs are adequate ✓ — ICs are inadequate — N/A
Remarks

D. General

1. **Vandalism/trespassing** — Location shown on site map — No vandalism evident ✓
Remarks

2. **Land use changes on site** N/A ✓
Remarks

3. **Land use changes off site** N/A ✓
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads — Applicable ✓ — N/A

1. **Roads damaged** — Location shown on site map — Roads adequate ✓ — N/A
Remarks

B. Other Site Conditions

Remarks AN AREA OF DEEP RUTTING WAS OBSERVED BETWEEN OLD BASE LANDFILL AND RUBBLE LANDFILL.

VII. LANDFILL COVERS

Applicable ✓ N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident ✓
   Areal extent____ Depth____
   Remarks____

2. **Cracks** Location shown on site map Cracking not evident ✓
   Lengths____ Widths____ Depths____
   Remarks____

3. **Erosion** Location shown on site map Erosion not evident ✓
   Areal extent____ Depth____
   Remarks____

4. **Holes** Location shown on site map Holes not evident ✓
   Areal extent____ Depth____
   Remarks____

5. **Vegetative Cover** Grass ✓ Cover properly established ✓ No signs of stress ✓
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks MOWED, NO SIGNS OF TREES OR SHRUBS

6. **Alternative Cover (armored rock, concrete, etc.)** N/A ✓
   Remarks____

7. **Bulges** Location shown on site map Bulges not evident ✓
   Areal extent____ Height____
   Remarks____

8.	**Wet Areas/Water Damage**	Wet areas/water damage not evident ✓		
	Wet areas	Location shown on site map	Areal extent_____	
	Ponding	Location shown on site map	Areal extent_____	
	Seeps	Location shown on site map	Areal extent_____	
	Soft subgrade	Location shown on site map	Areal extent_____	
	Remarks_____			
9.	**Slope Instability**	Slides	Location shown on site map	No evidence of slope instability ✓
	Areal extent_____			
	Remarks_____			

B. Benches Applicable ✓ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	**Flows Bypass Bench**	Location shown on site map	N/A or okay ✓
	Remarks_____		
2.	**Bench Breached**	Location shown on site map	N/A or okay ✓
	Remarks_____		
3.	**Bench Overtopped**	Location shown on site map	N/A or okay ✓
	Remarks_____		

C. Letdown Channels Applicable ✓ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1.	**Settlement**	Location shown on site map	No evidence of settlement ✓
	Areal extent_____	Depth_____	
	Remarks_____		
2.	**Material Degradation**	Location shown on site map	No evidence of degradation ✓
	Material type_____	Areal extent_____	
	Remarks_____		
3.	**Erosion**	Location shown on site map	No evidence of erosion ✓
	Areal extent_____	Depth_____	
	Remarks_____		

4. **Undercutting** Location shown on site map ✓ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ✓ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
✓ No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable N/A

1. **Gas Vents** Active ✓ Passive ✓
Properly secured/locked Functioning ✓ Routinely sampled Good condition ✓
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked ✓ Functioning ✓ Routinely sampled ✓ Good condition ✓
Evidence of leakage at penetration Needs Maintenance N/A
Remarks NEW PROBE POINTS INSTALLED SINCE LAST 5YR REVIEW. MOST PROBE POINTS WERE UNLOCKED, METHANE MONITORING PLAN IN PLACE.

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked ✓ Functioning ✓ Routinely sampled ✓ Good condition
Evidence of leakage at penetration Needs Maintenance ✓ N/A
Remarks SEVERAL LOCKS ARE INOPERABLE AND NEED REPLACED.

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A ✓
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed N/A ✓
Remarks_____

E. Gas Collection and Treatment Applicable N/A

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks N/A

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks N/A

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks

F. Cover Drainage Layer Applicable N/A

1. **Outlet Pipes Inspected** Functioning N/A
   Remarks

2. **Outlet Rock Inspected** Functioning N/A
   Remarks

G. Detention/Sedimentation Ponds Applicable N/A

1. **Siltation** Areal extent_____ Depth_____ N/A
   Siltation not evident
   Remarks

2. **Erosion** Areal extent_____ Depth_____
   Erosion not evident
   Remarks

3. **Outlet Works** Functioning N/A
   Remarks

4. **Dam** Functioning N/A
   Remarks

H. Retaining Walls Applicable N/A ✓

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement____ Vertical displacement____
   Rotational displacement____
   Remarks N/A

2. **Degradation** Location shown on site map Degradation not evident
   Remarks N/A

I. Perimeter Ditches/Off-Site Discharge Applicable ✓ N/A

1. **Siltation** Location shown on site map Siltation not evident ✓
   Areal extent____ Depth____
   Remarks____

2. **Vegetative Growth** ✓ Location shown on site map N/A
   Vegetation does not impede flow
   Areal extent ENTIRE SITE Type____
   Remarks ENCROACHING VEGETATION OBSERVED COVERING DRAINS AND ENCROACHING DITCHES

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent 20 FT Depth 1 FT
   Remarks NEAR GP-14, EAR BANK ADJACENT TO HIGHWAY 276.

4. **Discharge Structure** Functioning ✓ N/A
   Remarks ORANGE STAINING OBSERVED AT STREAM DISCHARGE FROM RIP-RAP. STAINING LIMITED TO FILM ON STREAM CHANNEL.

VIII. VERTICAL BARRIER WALLS Applicable N/A ✓

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent____ Depth____
   Remarks N/A

2. **Performance Monitoring** Type of monitoring____
   Performance not monitored
   Frequency____ Evidence of breaching
   Head differential____
   Remarks N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES Applicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   Good condition All required wells properly operating Needs Maintenance N/A
   Remarks LOCKS ON SOME WELLS WERE REMOVED AND/OR NOT FUNCTIONING. SOME WELLS WERE ENGULFED IN ENCROACHING VEGETATION.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks N/A

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks WELL LOCKS

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable N/A

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs Maintenance
   Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks

C. Treatment System Applicable N/A

1. **Treatment Train** (Check components that apply)
   - Metals removal — Oil/water separation — Bioremediation
   - Air stripping — Carbon adsorbers
   - Filters _____
   - Additive (*e.g.*, chelation agent, flocculent) _____
   - Others _____
   - Good condition — Needs Maintenance
   - Sampling ports properly marked and functional
   - Sampling/maintenance log displayed and up to date
   - Equipment properly identified
   - Quantity of groundwater treated annually _____
   - Quantity of surface water treated annually _____

   Remarks N/A

2. **Electrical Enclosures and Panels** (properly rated and functional)
   N/A — Good condition — Needs Maintenance

   Remarks _____

3. **Tanks, Vaults, Storage Vessels**
   N/A — Good condition — Proper secondary containment — Needs Maintenance

   Remarks _____

4. **Discharge Structure and Appurtenances**
   N/A — Good condition — Needs Maintenance

   Remarks _____

5. **Treatment Building(s)**
   N/A — Good condition (esp. roof and doorways) — Needs repair
   - Chemicals and equipment properly stored

   Remarks _____

6. **Monitoring Wells** (pump and treatment remedy)
   - Properly secured/locked — Functioning — Routinely sampled — Good condition
   - All required wells located — Needs Maintenance — N/A

   Remarks _____

D. Monitoring Data

1. Monitoring Data
   - Is routinely submitted on time — Is of acceptable quality

2. Monitoring data suggests:
   - Groundwater plume is effectively contained — Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   Properly secured/locked ✓ Functioning ✓ Routinely sampled ✓ Good condition
   All required wells located ✓ Needs Maintenance N/A
   Remarks MISSING OR INOPERABLE LOCKS OBSERVED

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

THE PURPOSE OF THE REMEDY IS TO DISALLOW THE USE OF GROUNDWATER THROUGH THE IMPLEMENTATION OF INSTITUTIONAL CONTROLS. LONG TERM MONITORING IS CONDUCTED ROUTINELY. THE REMEDY WAS OBSERVED TO BE EFFECTIVE AND FUNCTIONING AS INTENDED.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

PERIODIC MOWING IS EFFECTIVELY KEEPING TREE AND SHRUB GROWTH MINIMIZED. HOWEVER, MOWING DEBRIS WAS OBSERVED PARTIALLY COVERING DRAIN COVERS, POSSIBLY IMPEDING INFLOW. FURTHER, MONITOR POINTS ARE BEING ENGULFED IN VEGETATION.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

N/A

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

N/A

FTA

Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

I. Site Information
II. Interviews
III. On-site Documents & Records Verified
IV. O&M Costs
V. Access and Institutional Controls
VI. General Site Conditions
VII. Landfill Covers
VIII. Vertical Barrier Walls
IX. Groundwater/Surface Water Remedies
X. Other Remedies
XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION

Site name: FIRE TRAINING AREA (FTA)	**Date of inspection:** 15 JANUARY 2015
Location and Region: PORT DEPOSIT, MD / REGION 3	**EPA ID:** MDD 985397 256
Agency, office, or company leading the five-year review: DEPT OF NAVY / H+S ENVIRONMENTAL	**Weather/temperature:** CLEAR TO P.CLOUDY, CALM, 30's

Remedy Includes: (Check all that apply)

- Landfill cover/containment
- Access controls
- Institutional controls ✓
- Groundwater pump and treatment
- Surface water collection and treatment
- Monitored natural attenuation ✓
- Groundwater containment
- Vertical barrier walls
- Other LONG TERM MONITORING OF GROUNDWATER

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

4. **Other interviews** (optional) Report attached.

TONI LOZZI, ADMINISTRATIVE AND PROJECTS COORDINATOR, BAINBRIDGE DEVELOPMENT CORPORATION WAS INTERVIEWED ON SITE, 15 JANUARY 2015. SEE APPENDIX FOR DETAILS.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual — Readily available — Up to date — N/A ✓
   - As-built drawings — Readily available — Up to date — N/A ✓
   - Maintenance logs — Readily available — Up to date — N/A ✓

   Remarks

2. **Site-Specific Health and Safety Plan** — Readily available — Up to date — N/A ✓
   - Contingency plan/emergency response plan — Readily available — Up to date — N/A ✓

   Remarks

3. **O&M and OSHA Training Records** — Readily available — Up to date — N/A ✓

   Remarks

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available — Up to date — N/A ✓
   - Effluent discharge — Readily available — Up to date — N/A ✓
   - Waste disposal, POTW — Readily available — Up to date — N/A ✓
   - Other permits _____ — Readily available — Up to date — N/A ✓

   Remarks

5. **Gas Generation Records** — Readily available — Up to date — N/A ✓

   Remarks

6. **Settlement Monument Records** — Readily available — Up to date — N/A ✓

   Remarks

7. **Groundwater Monitoring Records** — Readily available ✓ — Up to date ✓ — N/A

   Remarks LONG TERM MONITORING DATA PROVIDED FROM THROUGH FOR THE TWO MONITORING WELLS ONSITE.

8. **Leachate Extraction Records** — Readily available — Up to date — N/A ✓

   Remarks

9. **Discharge Compliance Records**
   - Air — Readily available — Up to date — N/A ✓
   - Water (effluent) — Readily available — Up to date — N/A ✓

   Remarks

10. **Daily Access/Security Logs** — Readily available — Up to date — N/A ✓

    Remarks

IV. O&M COSTS

1. **O&M Organization**
   State in-house — Contractor for State
   PRP in-house — Contractor for PRP
   Federal Facility in-house — Contractor for Federal Facility
   Other _____

2. **O&M Cost Records** ✓ RECORDS NOT AVAILABLE
   Readily available — Up to date
   Funding mechanism/agreement in place
   Original O&M cost estimate _____ Breakdown attached

   Total annual cost by year for review period if available

   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: N/A

V. ACCESS AND INSTITUTIONAL CONTROLS — Applicable ✓ N/A

A. Fencing

1. **Fencing damaged** — Location shown on site map — Gates secured — N/A ✓
   Remarks _____

B. Other Access Restrictions

1. **Signs and other security measures** — Location shown on site map — N/A ✓
   Remarks _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes — No ✓ — N/A
Site conditions imply ICs not being fully enforced — Yes — No ✓ — N/A

Type of monitoring (*e.g.*, self-reporting, drive by) SELF-REPORTING
Frequency 15-MONTHS
Responsible party/agency DEPT OF NAVY
Contact JOE RAIL (Name) — RPM (Title) — (Date) — (Phone no.)

Reporting is up-to-date — Yes ✓ — No — N/A
Reports are verified by the lead agency — Yes ✓ — No — N/A

Specific requirements in deed or decision documents have been met — Yes ✓ — No — N/A
Violations have been reported — Yes — No ✓ — N/A
Other problems or suggestions: Report attached

2. **Adequacy** — ICs are adequate ✓ — ICs are inadequate — N/A
Remarks

D. General

1. **Vandalism/trespassing** — Location shown on site map — No vandalism evident ✓
Remarks

2. **Land use changes on site** N/A ✓
Remarks

3. **Land use changes off site** N/A ✓
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads — Applicable — N/A ✓

1. **Roads damaged** — Location shown on site map — Roads adequate — N/A ✓
Remarks

B. Other Site Conditions

Remarks CONCRETE PAD IS BEING OVERGROWN W/ VEGETATION. CONCRETE PAD HAS SIGNIFICANT CRACKS AND BREAKS. ONLY TWO MONITORING WELLS OBSERVED.

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
   Areal extent____ Depth____
   Remarks N/A

2. **Cracks** Location shown on site map Cracking not evident
   Lengths____ Widths____ Depths____
   Remarks N/A

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent____ Depth____
   Remarks N/A

4. **Holes** Location shown on site map Holes not evident
   Areal extent____ Depth____
   Remarks N/A

5. **Vegetative Cover** Grass Cover properly established No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks N/A

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
   Remarks

7. **Bulges** Location shown on site map Bulges not evident
   Areal extent____ Height____
   Remarks N/A

8. **Wet Areas/Water Damage** — Wet areas/water damage not evident
   - Wet areas — Location shown on site map — Areal extent_____
   - Ponding — Location shown on site map — Areal extent_____
   - Seeps — Location shown on site map — Areal extent_____
   - Soft subgrade — Location shown on site map — Areal extent_____

   Remarks N/A

9. **Slope Instability** — Slides — Location shown on site map — No evidence of slope instability
   Areal extent_____
   Remarks N/A

B. Benches — Applicable — N/A ✓
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** — Location shown on site map — N/A or okay ✓
   Remarks

2. **Bench Breached** — Location shown on site map — N/A or okay ✓
   Remarks

3. **Bench Overtopped** — Location shown on site map — N/A or okay ✓
   Remarks

C. Letdown Channels — Applicable — N/A ✓
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** — Location shown on site map — No evidence of settlement
   Areal extent_____ Depth_____
   Remarks N/A

2. **Material Degradation** — Location shown on site map — No evidence of degradation
   Material type_____ Areal extent_____
   Remarks N/A

3. **Erosion** — Location shown on site map — No evidence of erosion
   Areal extent_____ Depth_____
   Remarks N/A

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth_____
Remarks N/A

5. **Obstructions** Type_____ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks N/A

6. **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks N/A

D. Cover Penetrations Applicable ~~N/A~~

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
~~N/A~~
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance ~~N/A~~
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance ~~N/A~~
Remarks_____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance ~~N/A~~
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed ~~N/A~~
Remarks_____

E. Gas Collection and Treatment Applicable ~~N/A~~

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks N/A

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks N/A

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance ~~N/A~~
   Remarks

F. Cover Drainage Layer Applicable ~~N/A~~

1. **Outlet Pipes Inspected** Functioning ~~N/A~~
   Remarks

2. **Outlet Rock Inspected** Functioning ~~N/A~~
   Remarks

G. Detention/Sedimentation Ponds Applicable ~~N/A~~

1. **Siltation** Areal extent_____ Depth_____ ~~N/A~~
   Siltation not evident
   Remarks

2. **Erosion** Areal extent_____ Depth_____
   Erosion not evident
   Remarks N/A

3. **Outlet Works** Functioning N/A
   Remarks N/A

4. **Dam** Functioning N/A
   Remarks N/A

H. Retaining Walls Applicable N/A ✓

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement____ Vertical displacement____
   Rotational displacement____
   Remarks N/A

2. **Degradation** Location shown on site map Degradation not evident
   Remarks N/A

I. Perimeter Ditches/Off-Site Discharge Applicable N/A ✓

1. **Siltation** Location shown on site map Siltation not evident
   Areal extent____ Depth____
   Remarks N/A

2. **Vegetative Growth** Location shown on site map N/A ✓
   Vegetation does not impede flow
   Areal extent____ Type____
   Remarks

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent____ Depth____
   Remarks N/A

4. **Discharge Structure** Functioning N/A ✓
   Remarks

VIII. VERTICAL BARRIER WALLS Applicable N/A ✓

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent____ Depth____
   Remarks N/A

2. **Performance Monitoring** Type of monitoring____
   Performance not monitored
   Frequency____ Evidence of breaching
   Head differential____
   Remarks N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES	Applicable	N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   Good condition All required wells properly operating Needs Maintenance N/A
   Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks N/A

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks N/A

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable N/A

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs Maintenance
   Remarks N/A

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks N/A

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks N/A

C. Treatment System Applicable N/A

1. **Treatment Train** (Check components that apply)
   - Metals removal — Oil/water separation — Bioremediation
   - Air stripping — Carbon adsorbers
   - Filters _____
   - Additive (*e.g.*, chelation agent, flocculent) _____
   - Others _____
   - Good condition — Needs Maintenance
   - Sampling ports properly marked and functional
   - Sampling/maintenance log displayed and up to date
   - Equipment properly identified
   - Quantity of groundwater treated annually _____
   - Quantity of surface water treated annually _____

   Remarks N/A

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - N/A — Good condition — Needs Maintenance

   Remarks _____

3. **Tanks, Vaults, Storage Vessels**
   - N/A — Good condition — Proper secondary containment — Needs Maintenance

   Remarks _____

4. **Discharge Structure and Appurtenances**
   - N/A — Good condition — Needs Maintenance

   Remarks _____

5. **Treatment Building(s)**
   - N/A — Good condition (esp. roof and doorways) — Needs repair
   - Chemicals and equipment properly stored

   Remarks _____

6. **Monitoring Wells** (pump and treatment remedy)
   - Properly secured/locked — Functioning — Routinely sampled — Good condition
   - All required wells located — Needs Maintenance — N/A

   Remarks _____

D. Monitoring Data

1. Monitoring Data
   - Is routinely submitted on time — Is of acceptable quality

2. Monitoring data suggests:
   - Groundwater plume is effectively contained — Contaminant concentrations are declining

D-18

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   Properly secured/locked ✓ Functioning ✓ Routinely sampled ✓ Good condition
   All required wells located ✓ Needs Maintenance ✓ N/A
   Remarks WELL LOCKS MISSING. ONE WELL CAP WAS CRACKED. THE OTHER CAP WAS SEIZED TO CASING.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

THE PURPOSE OF THE REMEDY IS TO DISALLOW THE USE OF GROUNDWATER THROUGH THE IMPLEMENTATION OF INSTITUTIONAL CONTROLS. THE REMEDY APPEARS TO BE EFFECTIVE AND NO EVIDENCE OF VIOLATION WAS OBSERVED.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

N/A

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. N/A

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. N/A

APPENDIX B

SITE PHOTOGRAPHS

OBL Photograph 1

Panoramic view of Site 1 facing southeast from across Maryland Route 276.

OBL Photograph 2

General view of Site 1 and signage.

OBL Photograph 3

View of Site 1 road and slope, facing northwest. Road was in good condition.

OBL Photograph 4

General view of Site 1 cap and vents, facing west. Vents were replaced in 2007.

OBL Photograph 5

View of Site 1 rip-rapped channel along southern edge. Channel is shown free of debris and appears to be effective.

OBL Photograph 6

View of Site 1 rip-rapped letdown channel along southern edge. Channel is shown free of debris and appears to be effective.

OBL Photograph 7

View of rip-rapped channel along western end of Site 1. Channel is shown free of debris and appears to be effective.

OBL Photograph 8

View of typical Site 1 monitoring wells located offsite.

OBL Photograph 9

View of typical Site 1 gas probe/monitoring point. Several had malfunctioning locks or were missing locks.

OBL Photograph 10

View of typical Site 1 flush mount gas probe/monitoring point located offsite.

OBL Photograph 11

View of typical Site 1 monitoring wells located onsite. Several had malfunctioning locks that will need removed and replaced.

OBL Photograph 12

View of Site 1 entrance gate. Gate is damaged, but functional.

OBL Photograph 13

View of perimeter boundary fence along Maryland Route 276. Note gap underneath fence big enough for a person.

OBL Photograph 13

View of hole in perimeter boundary fence along Maryland Route 276. This is located north of the gate and near to GP14.

OBL Photograph 14

View of Site 1 drain grate partially covered with vegetation.

OBL Photograph 15

View of Site 1 facing east from Maryland Route 276 near GP14. Sign needs repaired.

OBL Photograph 16

View of erosion near Maryland Route 276 and near GP14. Note, this is erosion is not impacting Site 1.

OBL Photograph 17

View of area between Site 1 and the adjacent Rubble Landfill. Note the ruts in the area.

OBL Photograph 18

View of the stream adjacent to Maryland Route 276. Note the red staining that has been historically documented. This staining is suspected to be a result of the rip-rap used at the site weathering.

FTA Photograph 1

West facing view of the concrete pad associated with the former FTA. Substantial vegetation was observed growing through cracks in the concrete.

FTA Photograph 2

West-southwest facing view of the concrete pad associated with the former FTA. Substantial vegetation was observed growing through cracks in the concrete.

FTA Photograph 3

Southwest facing view of the concrete pad associated with the former FTA. Substantial vegetation was observed growing through cracks in the concrete.

FTA Photograph 4

Monitoring well 2-GW-2 associated with the former FTA. Both monitoring wells were unlocked and need well caps replaced; however, there was no sign of vandalism.

FTA Photograph 5

Monitoring well associated with the former FTA showing compromised well cap.

FTA Photograph 6

Monitoring well 2-GW-1 associated with the former FTA. Note Happy Valley Branch is in the background.

FTA Photograph 7

Southwest view of former FTA from monitoring well 2-GW-2 showing Happy Valley Branch.

FTA Photograph 8

East view of former FTA from monitoring well 2-GW-2 showing Happy Valley Branch.

FTA Photograph 9

Northwest facing view of the former FTA. Substantial vegetation was observed at the site, and may impede access to monitoring wells if not controlled.

APPENDIX C

SITE INSPECTION ROSTERS

INSPECTION TEAM ROSTER

FTA, 15 January 2015

1. Joe Rail, NAVFAC
2. Pat Schauble, H&S Environmental, Inc.
3. Steve Deeter, H&S Environmental, Inc.

INSPECTION TEAM ROSTER

OBL, 15 January 2015

1. Joe Rail, NAVFAC
2. Pat Schauble, H&S Environmental, Inc.
3. Steve Deeter, H&S Environmental, Inc.

APPENDIX D

INTERVIEW RECORDS

5-Year Interview for Old Base Landfill and Fire Training Area
Donna Tapley, Bainbridge Development Corporation

Construction Considerations

1. *What is your overall impression of the project? (general sentiment)*

   The community and Bainbridge Development Corporation (BDC) expect the Bainbridge property to be redeveloped into commercial and residential uses. A lack of an agreed upon remedy between the Navy, BDC and regulators have stymied all development opportunities, lost funding for infrastructure improvements, caused development projects to move elsewhere in the County and have had a huge negative impact on the Town.

2. *What is the current status of construction (e.g., budget and schedule)?*

   At this time, there is no schedule for the residential component due to the nature of the contamination; however commercial projects are being pursued.

3. *Have any problems been encountered which required, or will require, changes to this remedial design or this ROD?*

   No comment at this time.

4. *Have any problems or difficulties been encountered which have impacted construction progress or implementability?*

   Identification of contamination not previously identified has negatively impacted construction progress.

5. *Do you have any comments, suggestions, or recommendations regarding the project (i.e., design, construction documents, constructability, management, regulatory agencies, etc.)?*

   Implementing cleanup of the site or funding thereof is essential for the property transfer negotiated in 1999 to be successful.

Performance, Operation And Maintenance Problems

1. *What is your overall impression of the project? (general sentiment)*

   Generally, the performance standards identified in the ROD have not been achieved and additional regulatory requirements have been imposed thus costing more and creating uncertainty for the locals.

2. *Is the remedy functioning as expected? How well is the remedy performing?*

   Remedy is not functioning as designed because performance standards have not been achieved – not in 2005, not in 2010 nor in 2015.

3. *What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?*

   Generally, Old Base Landfill is operating as the Navy designed, but data continues to show exceedances of groundwater performance standards for iron and manganese. Additionally,

methane exceedances have been identified at the property boundary which the Navy is actively engaged.

4. *Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.*

   Yes. The BDC contracts a third party consultant to assess operation and maintenance activities semi-annually, reports and any deficiencies are fixed. A property maintenance crew are on the property weekly and implement necessary repairs and report activities. BDC staff also conduct routine property checks.

5. *Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.*

   Sampling requirements have increased in frequency and analyses.

6. *Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.*

   Monitoring costs have increased since implementation of the ROD due to regulatory requirements and the identification of additional contaminants. The identification of widespread (site wide) contamination in 2010 has created difficulties and increased costs.

7. *Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.*

   BDC has tried to maximize sampling efforts with its subcontractor to optimize costs by scheduling the sampling of groundwater and methane at the same intervals.

8. *Do you have any comments, suggestions, or recommendations regarding the project?*

   The Navy and Bainbridge Development Corporation should come to an agreement on the site wide contamination and long term monitoring efforts.

TONI

OBL

Toni Lozzi-BDC

Interview	Information Sought
Community Representatives*	– members of the community may provide a broader view of site activities and issues than can be obtained during the site inspection

* Several types of individuals may be interviewed: residents/businesses adjacent to or on the site; residents/businesses within the path of migration; local civic leaders, local officials, Community Advisory Group (CAG), Technical Assistance Grant (TAG) group, and local environmental groups; and other audiences listed in the community profile in the Community Involvement Plan.

Some example interview questions are given below.

1. What is your overall impression of the project? (general sentiment)
   adequate on reviews
2. What effects have site operations had on the surrounding community?
   nothing
3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
   nothing
4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.
   not for OBL
5. Do you feel well informed about the site's activities and progress?
   yes
6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
   no

State and Local Considerations

State and local authorities may provide you with information about changes in State laws and regulations and present and prospective land uses and restrictions.

Interview	Information Sought
State Contacts (including those responsible for State water quality, hazardous waste, and environmental health issues)	– changes in State laws and regulations that may impact protectiveness – whether the site has been in compliance with permitting or reporting requirements – information on site activities, status, and issues
Local Authorities (such as police, emergency response or fire departments, and local environmental or planning offices)	– status of institutional controls, site access controls, new ordinances in place, changes in actual or projected land use, complaints being filed, and unusual activities at the site

TONI

FTA

Toni Lozzi-BDC

Interview	Information Sought
Community Representatives*	– members of the community may provide a broader view of site activities and issues than can be obtained during the site inspection

* Several types of individuals may be interviewed: residents/businesses adjacent to or on the site; residents/businesses within the path of migration; local civic leaders, local officials, Community Advisory Group (CAG), Technical Assistance Grant (TAG) group, and local environmental groups; and other audiences listed in the community profile in the Community Involvement Plan.

Some example interview questions are given below.

1. What is your overall impression of the project? (general sentiment)
   adequate on news
2. What effects have site operations had on the surrounding community?
   none
3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
   none
4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.
   none
5. Do you feel well informed about the site's activities and progress?
   Yes
6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
   no

State and Local Considerations

State and local authorities may provide you with information about changes in State laws and regulations and present and prospective land uses and restrictions.

Interview	Information Sought
State Contacts (including those responsible for State water quality, hazardous waste, and environmental health issues)	– changes in State laws and regulations that may impact protectiveness – whether the site has been in compliance with permitting or reporting requirements – information on site activities, status, and issues
Local Authorities (such as police, emergency response or fire departments, and local environmental or planning offices)	– status of institutional controls, site access controls, new ordinances in place, changes in actual or projected land use, complaints being filed, and unusual activities at the site

INTERVIEW RECORD				
Site Name: Former Naval Training Center - Bainbridge			**EPA ID No.:**	
Subject: 2015 Five-Year ROD Review			**Time:**	**Date:**
Type: E-mail	Visit **Location of Visit:**	Other	Incoming	✓ Outgoing
Contact Made By:				
Name: **Laurie Ekes**	**Title:** Environmental Scientist		**Organization:** **H&S Environmental**	
Email: lekes@hsenv.com			Phone: (508)367-7190	
	Individual Contacted:			
Name: **Binyam Woldemichael**	**Title: MDE Geologist**		**Organization:** Maryland Department of the Environment (Solid Waste Program)	
Telephone No: 410.537.3108		**Street Address:** 1800 Washington Blvd. **City, State, Zip:** Baltimore, MD 21230		
E-Mail Address: Binyam.woldemichael@maryland.gov				

Summary of Conversation:

The following questions were asked in order to gain a perspective on State and Local Considerations

1. What is your overall impression of the project? (General sentiment)

The Navy and the Bainbridge Development Corporation (BDC) communicate with the Solid Waste Program (SWP) regarding the Old Base Landfill (OBL) methane monitoring. I have a positive impression of the project as the project managers are actively trying to be in compliance with State and federal (sic) laws regarding landfill gas.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

It is our understanding that you are referring to the OBL. The SWP has no involvement with the Fire Training Area and the groundwater monitoring of the site. MDE deferred technical oversight of the groundwater monitoring to EPA. The SWP does not conduct regular site visits or inspections. However, the SWP receives and reviews semiannual landfill gas monitoring reports for the OBL

3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

There are currently concentrations of methane in soil gas above the Lower Explosive Limit (LEL) at the property boundary of the OBL. Under Maryland solid waste regulations, the facility must control the migration of landfill gas so that the concentration of methane generated by the landfill does not exceed 25 percent of the LEL in facility structures or at the property

boundary. The Navy has conducted an investigation of the gas migration and is monitoring new gas wells at the property boundary to assess the potential for methane in soil gas to migrate across the property boundary at concentrations in excess of the LEL.

4. Do you feel well informed about the site's activities and progress?

We are informed about the activities at the OBL regarding methane gas monitoring only. We have no knowledge of the Fire Training Area or groundwater monitoring at the site except for the 2010 five year review report.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

The Navy should continue to monitor the landfill gas at the site in coordination with BDC. The Navy is investigating whether remediation is warranted at the site and is actively monitoring for soil gas migration. A remediation plan may need to be developed to address the migration of methane across the property boundary but this has not yet been determined.

The EPA is responsible for the groundwater monitoring and we do not have additional comment.

INTERVIEW RECORD				
Site Name: Former Naval Training Center - Bainbridge			**EPA ID No.:**	
Subject: 2015 Five-Year ROD Review			**Time:**	**Date:**
Type: Telephone	Visit **Location of Visit:**	Other	Incoming	✓ Outgoing
Contact Made By:				
Name: **Laurie Ekes**	**Title:** Environmental Scientist		**Organization:** **H&S Environmental**	
Email: lekes@hsenv.com			Phone: (508)367-7190	
	Individual Contacted:			
Name: **Lorie Baker**	**Title: EPA RPM**		**Organization:** EPA, Region 3	
Telephone No: 215-814-3355		**Street Address:** 1650 Arch Street **City, State, Zip:** Philadelphia, PA 19103		
E-Mail Address: Baker.lorie@epa.gov				

Summary of Conversation:

The following questions were asked in order to gain a perspective on **State and Local Considerations**

1. What is your overall impression of the project? (General sentiment)

I have only been involved in the post-decision document monitoring/5-yr reviews of the landfill and have not had any major issues with the implementation of the remedy.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results. **EPA has not conducted any routine communications or activities in regard to this site. We have been given work plans for review and copies of monitoring results and have provided feedback when appropriate. Since this is a non-NPL site, and since we no longer receive BRAC funding to provide any further oversight, the role for EPA is limited in this project.**

3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
No

4. Do you feel well informed about the site's activities and progress? **I receive periodic results of the methane monitoring of the landfill. This is the only ongoing activity I am aware of.**

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation? **Although EPA does not have an active role in oversight, please continue to keep us informed of any activities associated with the continued monitoring of this landfill.**

INTERVIEW RECORD				
Site Name: Former Naval Training Center - Bainbridge			**EPA ID No.:**	
Subject: 2015 Five-Year ROD Review			**Time:**	**Date:**
Type: E-Mail	Visit **Location of Visit:**	Other	Incoming	✓ Outgoing
Contact Made By:				
Name: Laurie Ekes	**Title:** Environmental Scientist		**Organization: H&S Environmental**	
Email: lekes@hsenv.com				
	Individual Contacted:			
Name: Prem Neupane	**Title: LTM Contractor**		**Organization:** Apex Environmental	
Telephone No: 301-417-0200		**Street Address:** 15850 Crabbs Branch Way, STE 200 **City, State, Zip:** Rockville, MD 20855		
E-Mail Address: pneupane@apexcos.com				

The following questions were asked in order to gain a perspective on **Performance, Operation and Maintenance**

1. What is your overall impression of the project? (general sentiment)

LTM is going well but does not indicate that Performance Standard for Iron and Manganese in certain wells at OBL and FT will be met any time soon. May need to reevaluate the overall project including updated Risk Assessment/applicability of PS since it was derived decades ago and new toxicity data for chemicals of concern are available.

2. Is the remedy functioning as expected? How well is the remedy performing?
After all these years performance standards for certain parameters are still exceeded.

3. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?
Monitoring data for groundwater at OBL & FT does not show a single trend, either increasing or decreasing, but rather fluctuate. Methane detections on southwestern site boundary is a concern.

4. Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.

Apex inspects site on a quarterly basis – four visits a year. Two staff and generally two days per event.

5. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

A new monitoring schedule was agreed upon during the last 5-yr review. No changes in the O&M Plan has been implemented since 2010.

6. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

No.

7. Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

Navy added new gas monitoring probes. Apex conducts monitoring for additional probes during its quarterly monitoring of other gas probes, thereby saving costs and improved efficiency.

8. Do you have any comments, suggestions, or recommendations regarding the project?

Potential offsite migration of methane on southwest property is a concern. MDE is likely going to require a mitigation plan should the levels observed currently continue to remain high.

APPENDIX E

ZONING MAP-2015

Official Zoning Map: Port Deposit

This is to certify that this is the Official Zoning map referred to in Article II, Section 13 of the Zoning Ordinance of the Town of Port Deposit, Maryland and supersedes and replaces the Official Zoning Maps adodpted February 2, 2010.

__02-2015_____ Resolution #

_February 03,2015_____ Date Adopted

_____ Mayor

_____ Date

_____ Council Person

_____ Date

_____ Council Person

_____ Date

_____ Council Person

_____ Date

_____ Council Person

_____ Date

_____ Council Person

_____ Date

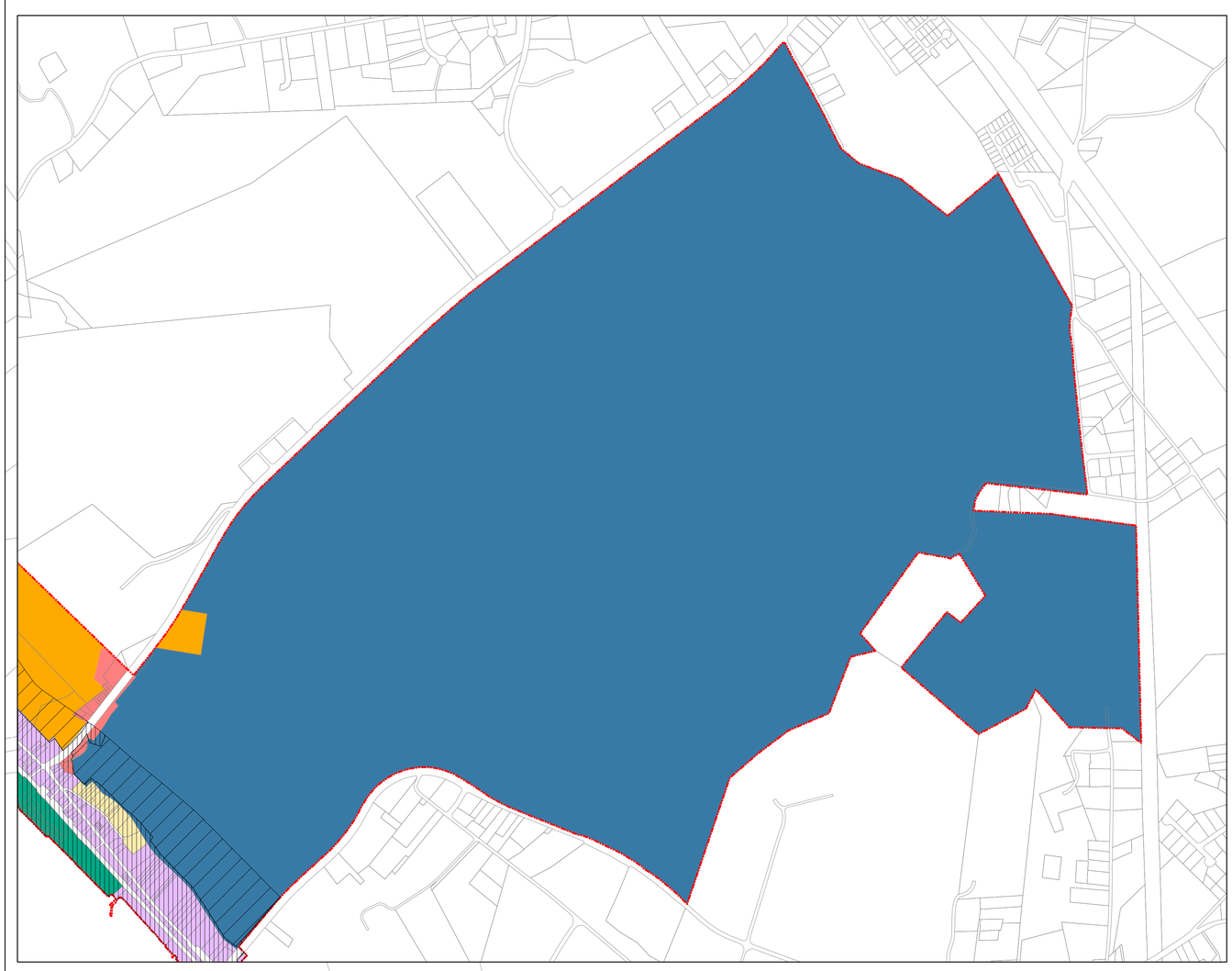
_____ Council Person

_____ Date

Amended:
October 28, 2003, Resolution 2003-20. New Zoning Ordinance & Map.
January 4, 2005, Resolution 2004-05. Create IDOD.
April 5, 2005, Resolution 2005-09. Change Parcel 6 to CBD.
August 30, 2005, Resolution 2005-11. Change Parcels 648, 665 to BX.
February 8, 2008, Resoultion 2008-01.Change Parcels 350-398 from R1 to RM.
February 2, 2010, Resolution 2010-1. Change Parcels 29-48, 99 to CBD.
February 2, 2010, Resolution 2010-2. Change Parcel 328 to CBD.

Legend

- Municipal Boundary
- Historic Overlay District
- Old Town Infill Overlay
- IDA
- LDA
- RCA
- R1 - Single Family Residential
- RM - Single Family Residential
- R2 - Single Family Residential
- TR - Town Residential
- CBD - Central Business District
- C1 - Town Commercial
- MC - Marine Commercial
- BX - Bainbridge Mixed Use



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